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County of Riverside
Planning Department

Palen Solar Project

(formerly Palen Solar Power Project)

DOI-BLM-CA-060-2017-001-EIS

DRAFT

Supplemental Environmental Impact Statement/ Environmental Impact Report/ Land Use Plan Amendment

Index No. BLM/CA/PL-2017/012+1793+2050
CA State Clearinghouse No. 2011054002

VOLUME 2: APPENDICES

October 2017

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NEPA and CEQA Lead Agencies:

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Palm Springs–South Coast Field Office

RIVERSIDE COUNTY
PLANNING DEPARTMENT

October 2017

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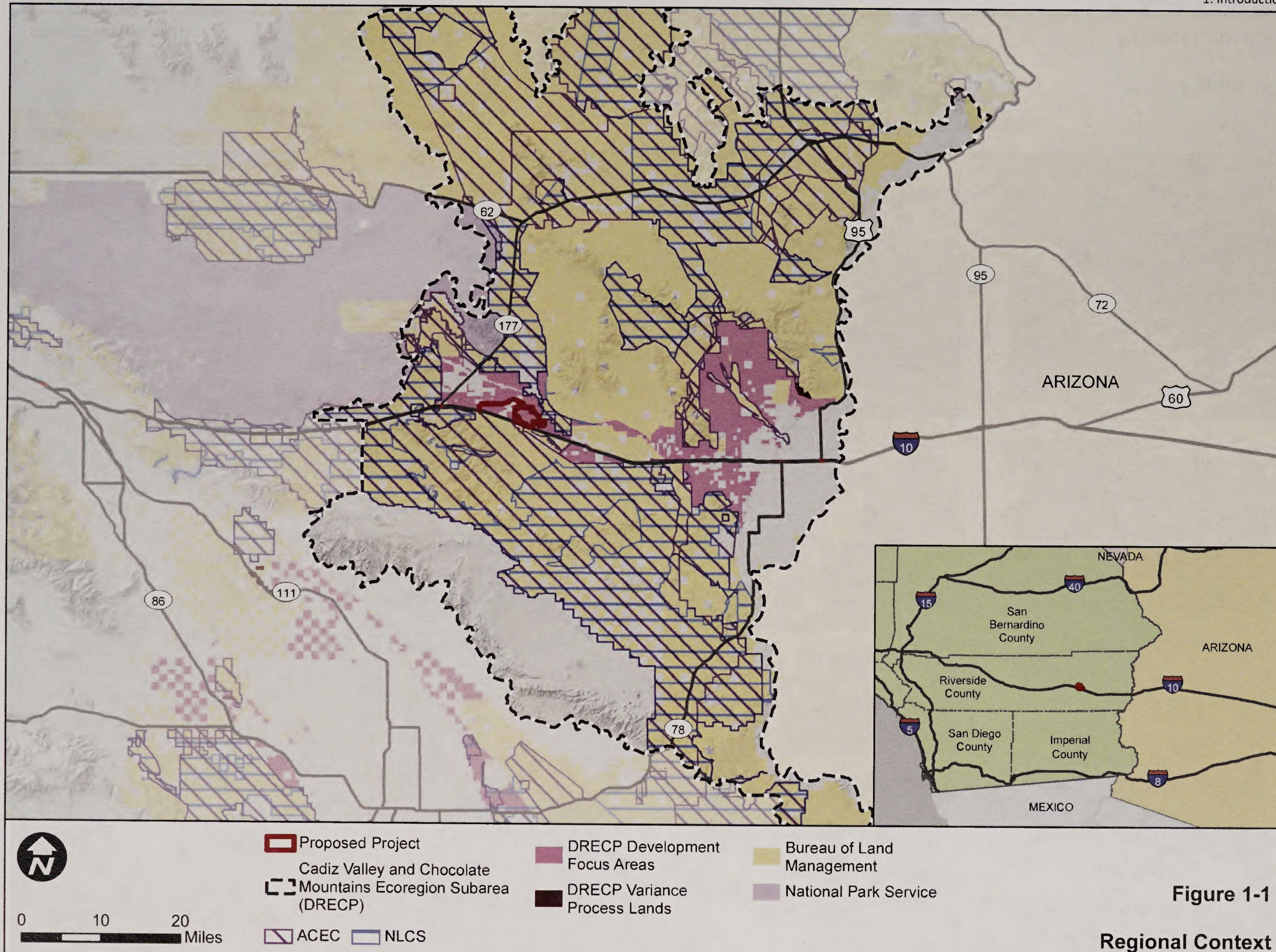

Figure 1-1

Regional Context

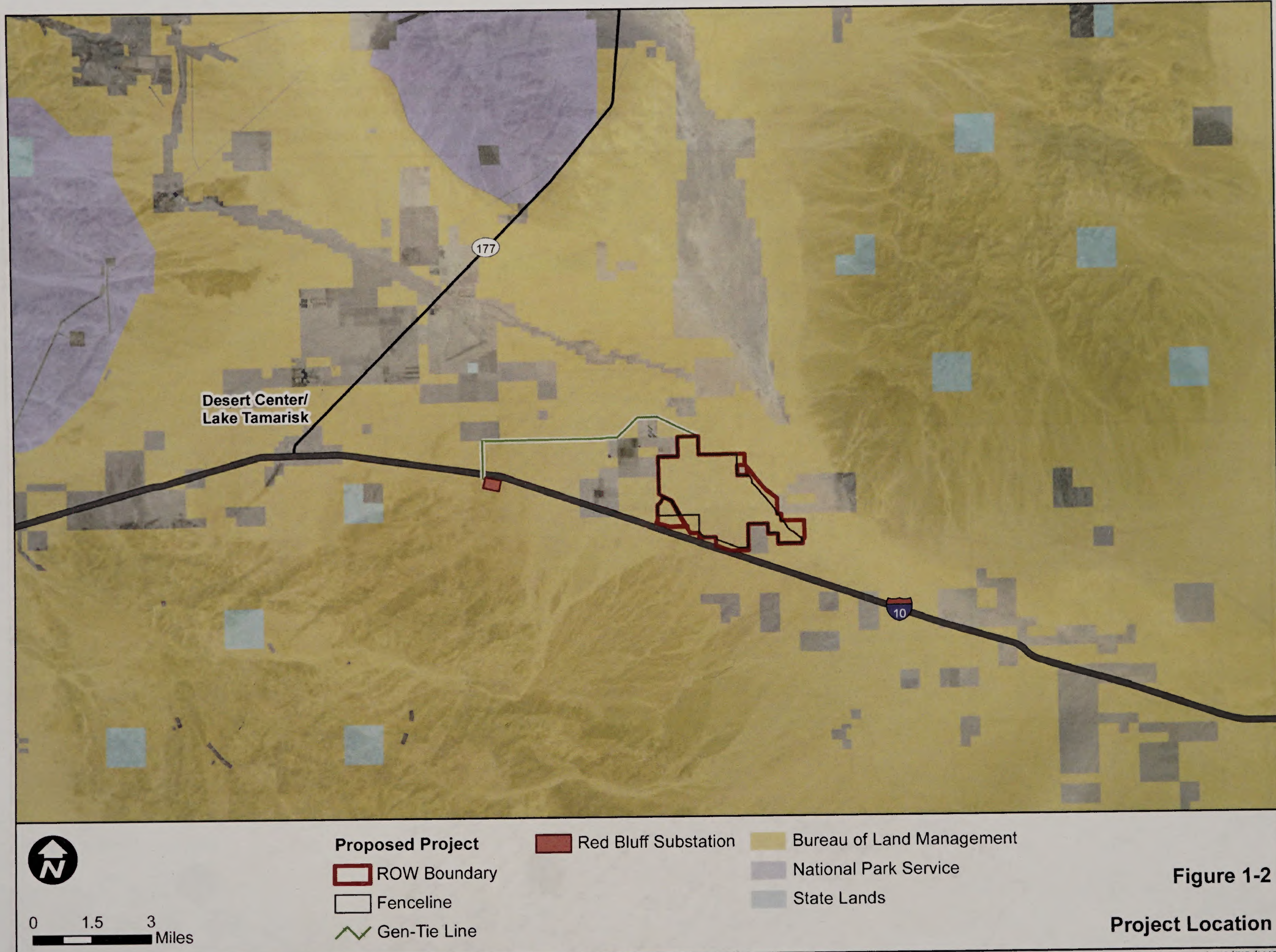

Figure 1-2

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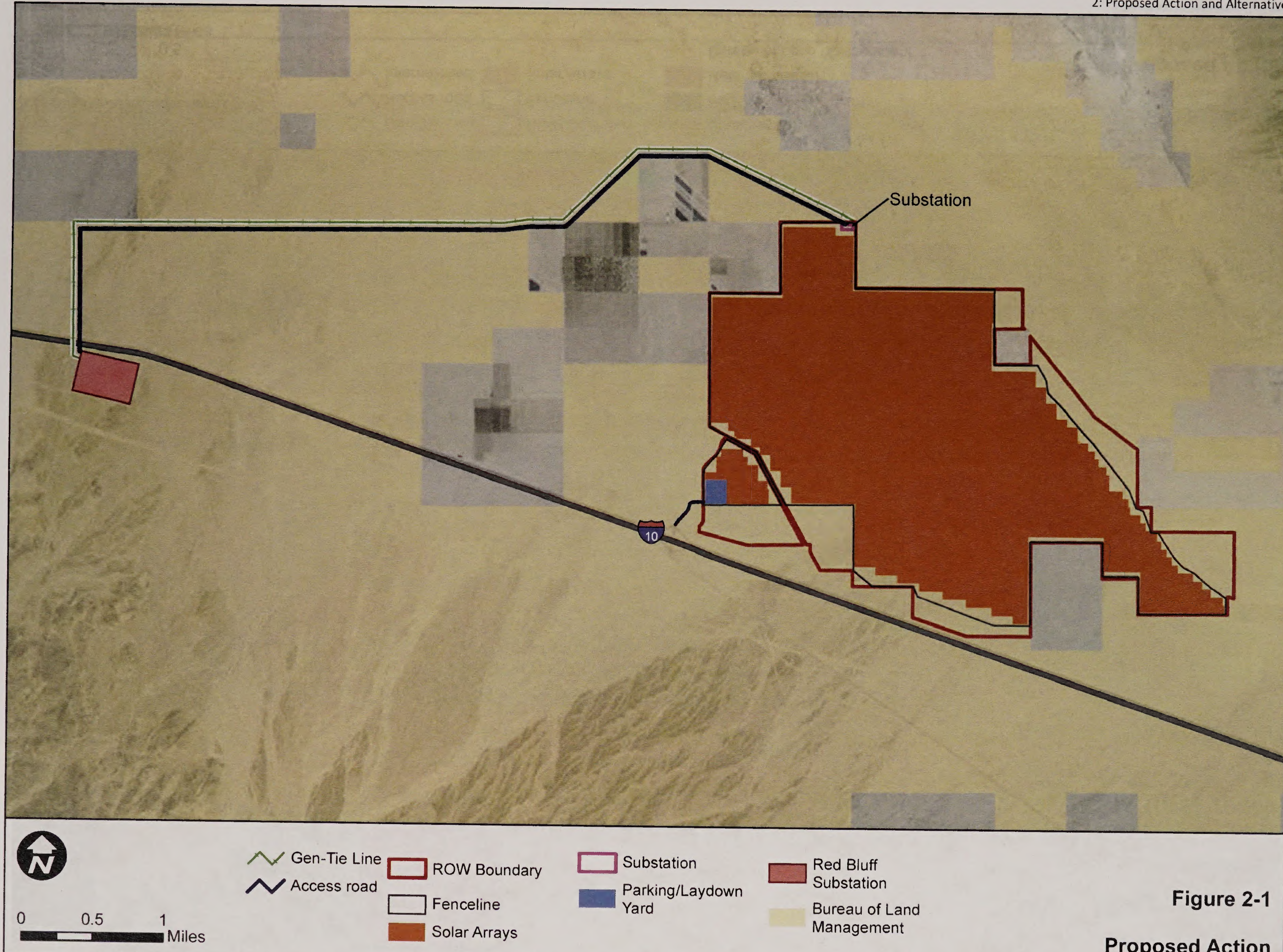
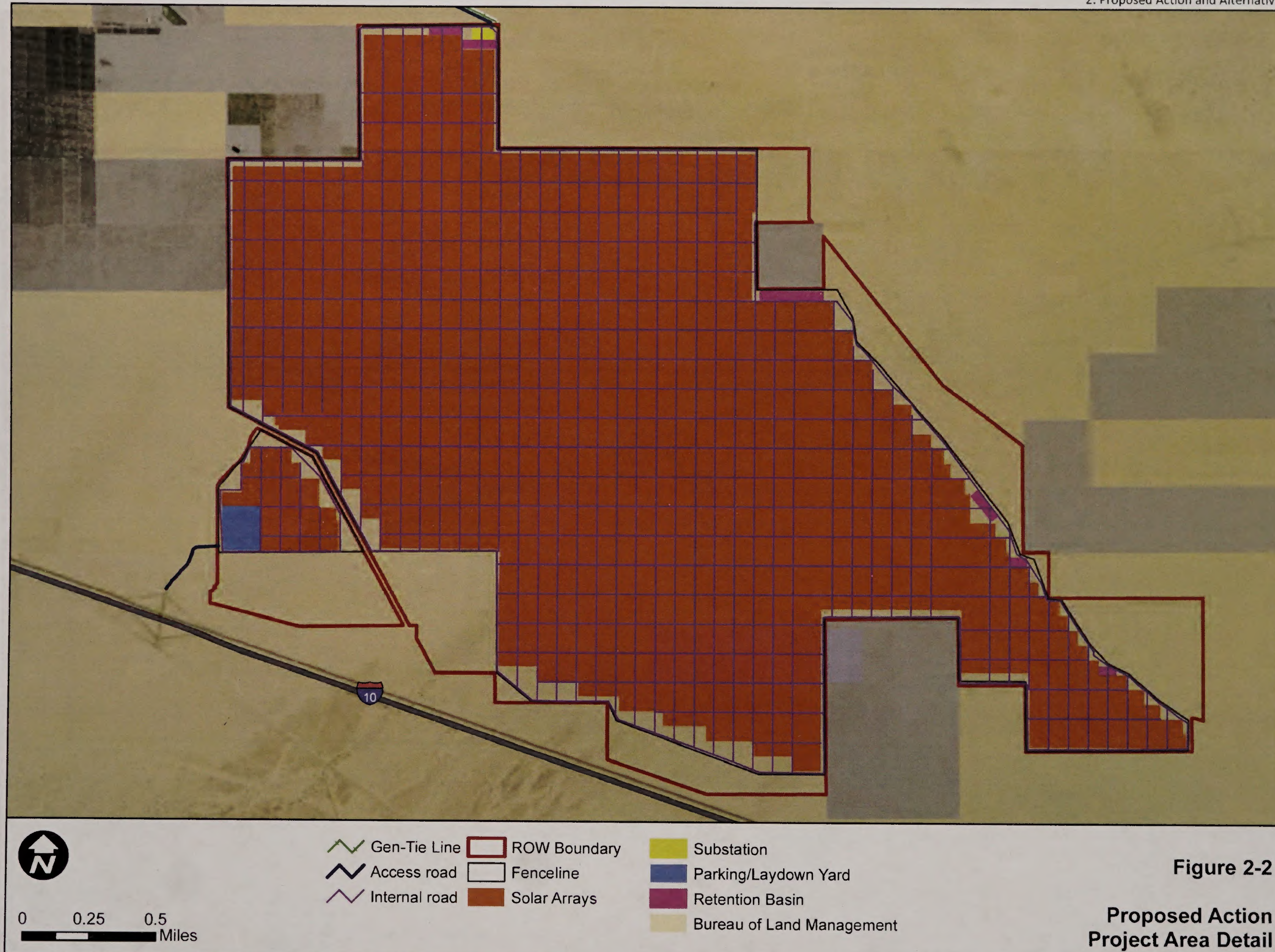


Figure 2-1

Proposed Action



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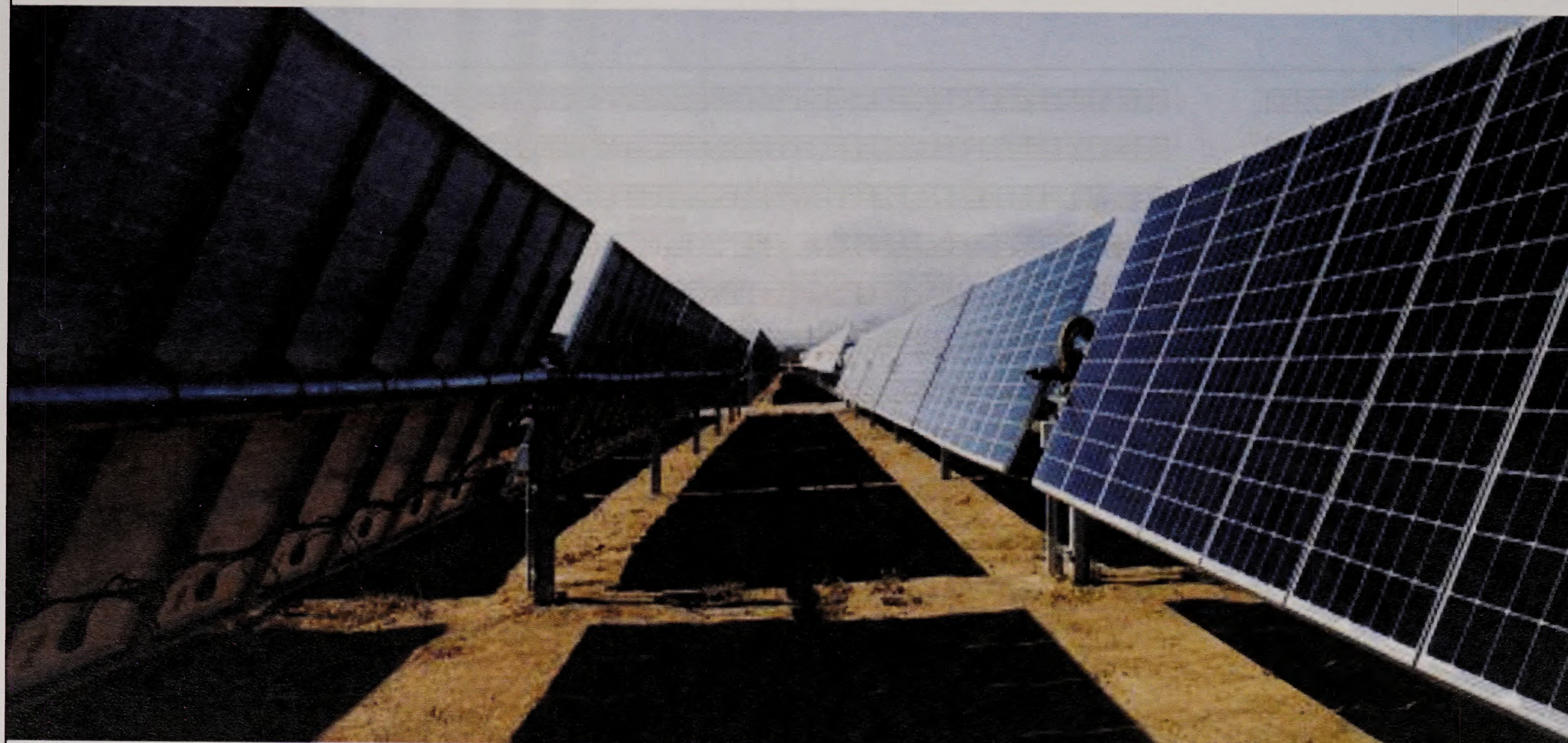
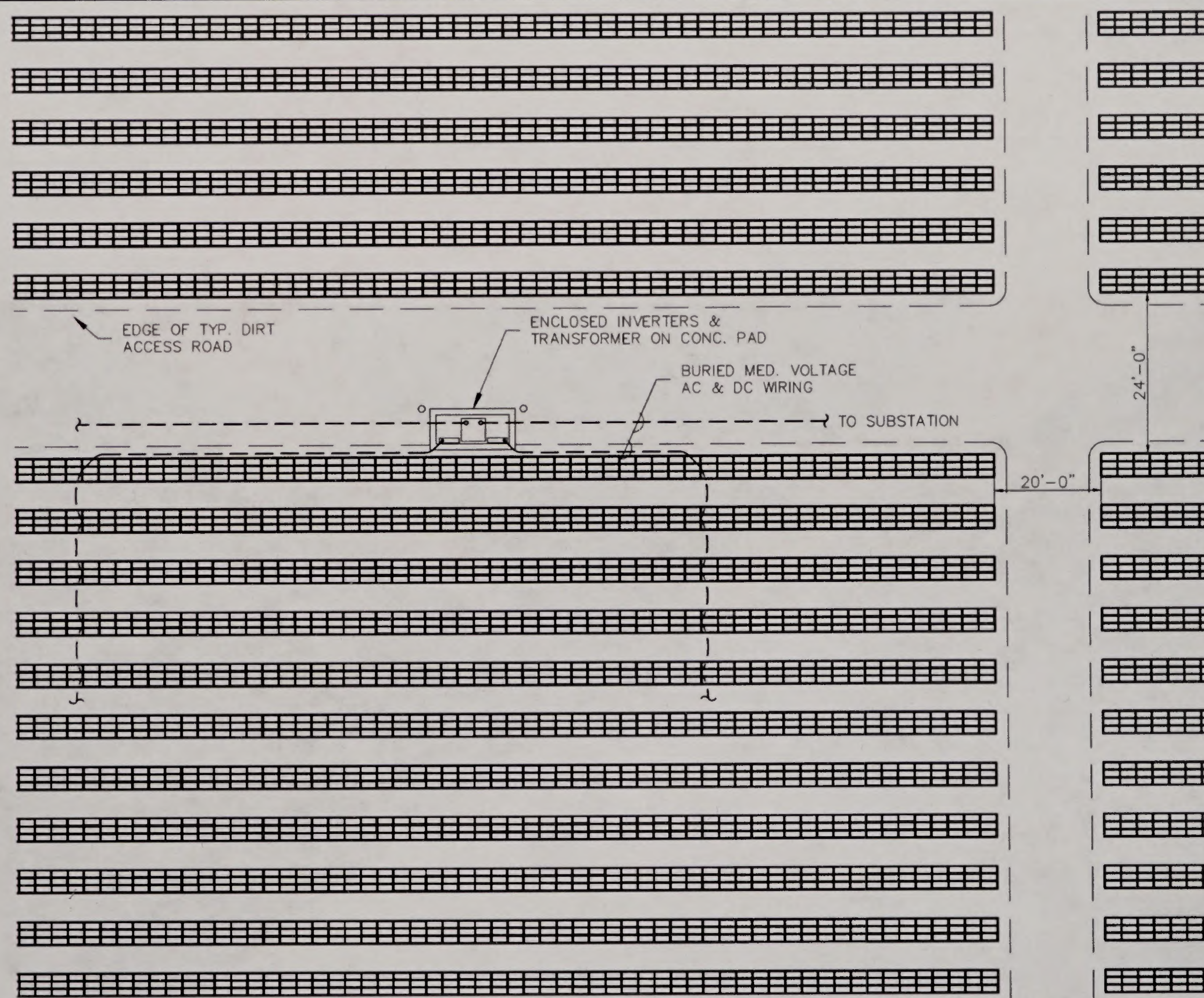
Proposed Action Project Area Detail



Source: EDF, 2016.

Figure 2-3

Typical Photovoltaic Array



Source: EDF, 2016.

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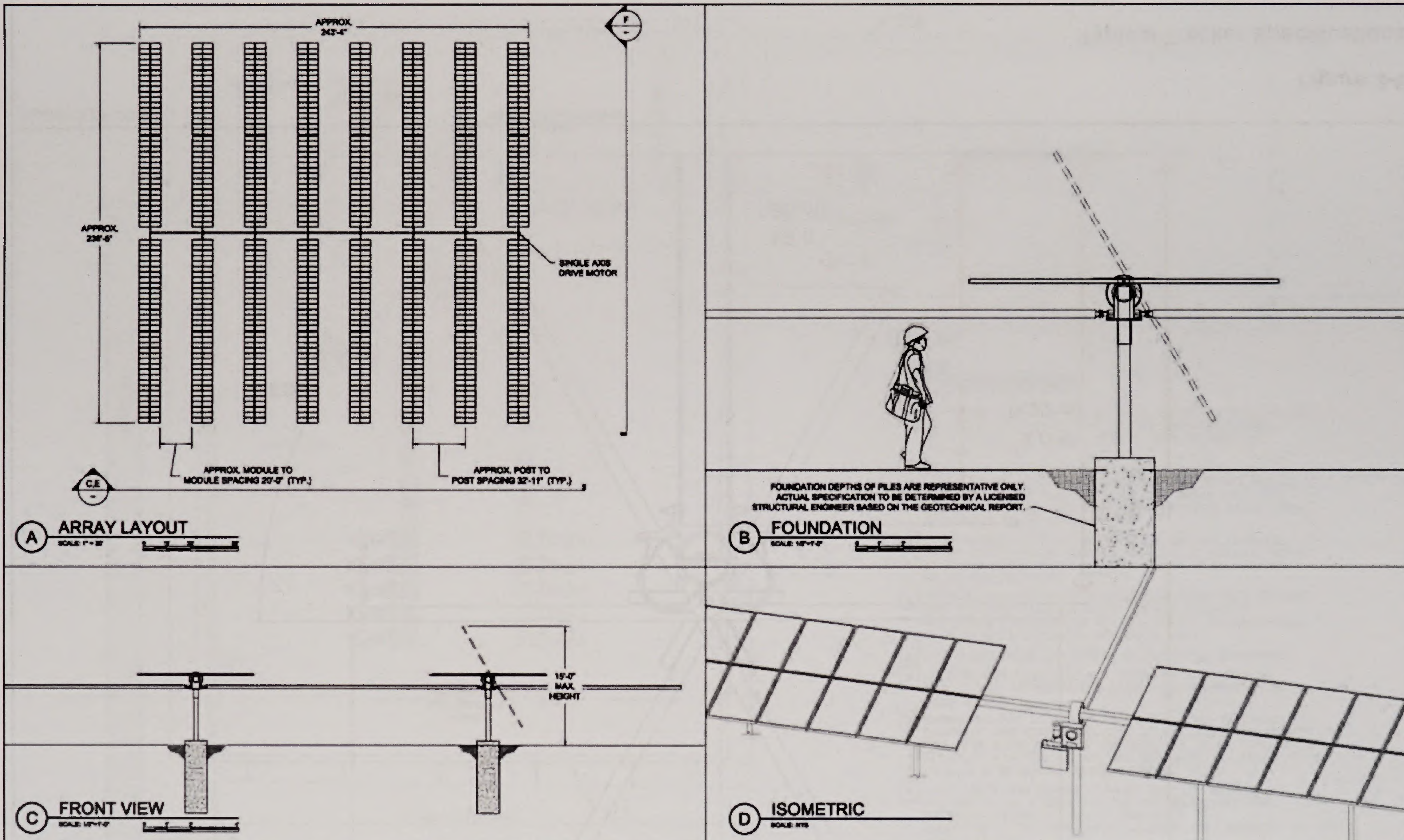
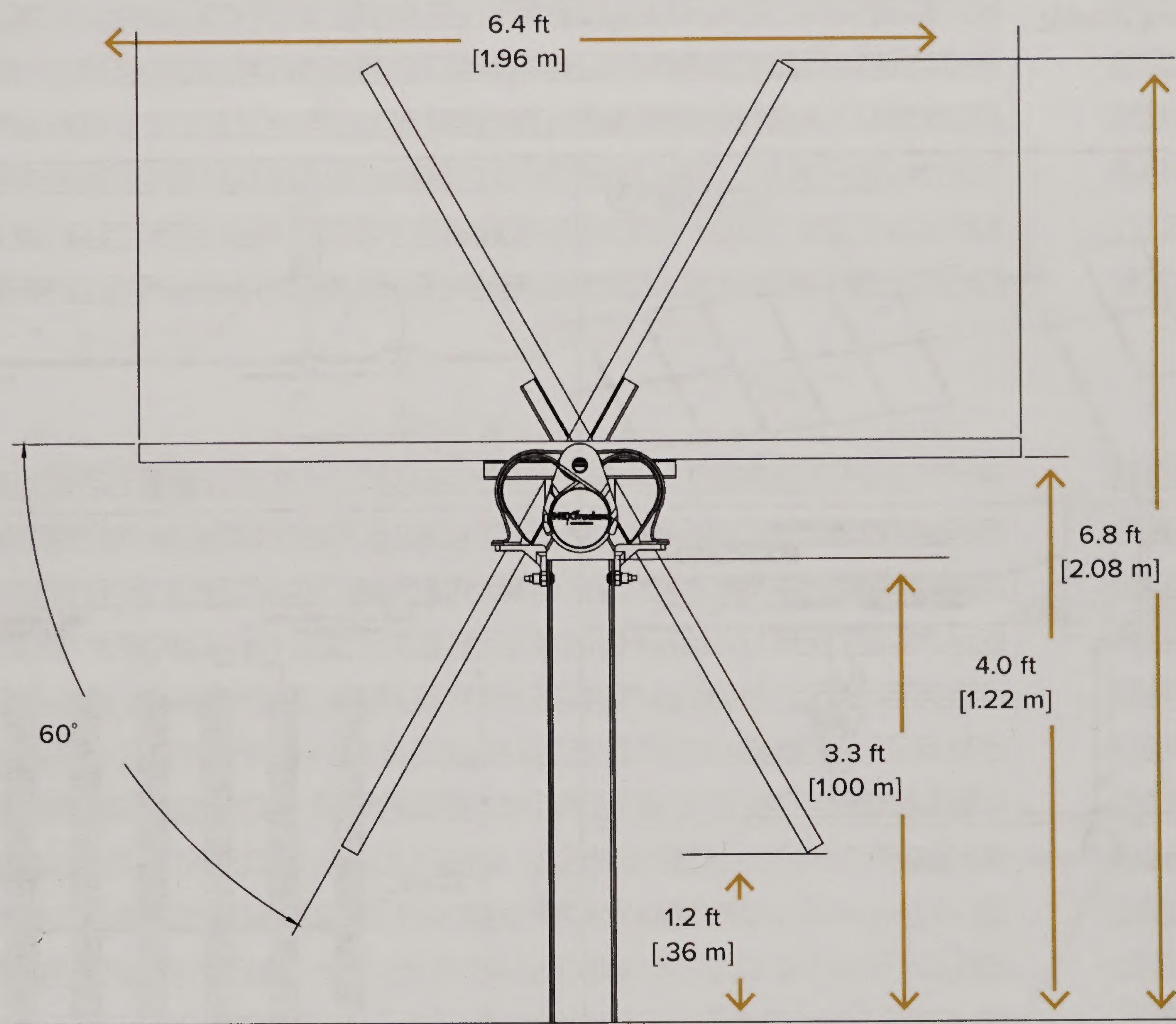
Typical Array Configuration



Source: EDF, 2016.

Figure 2-5

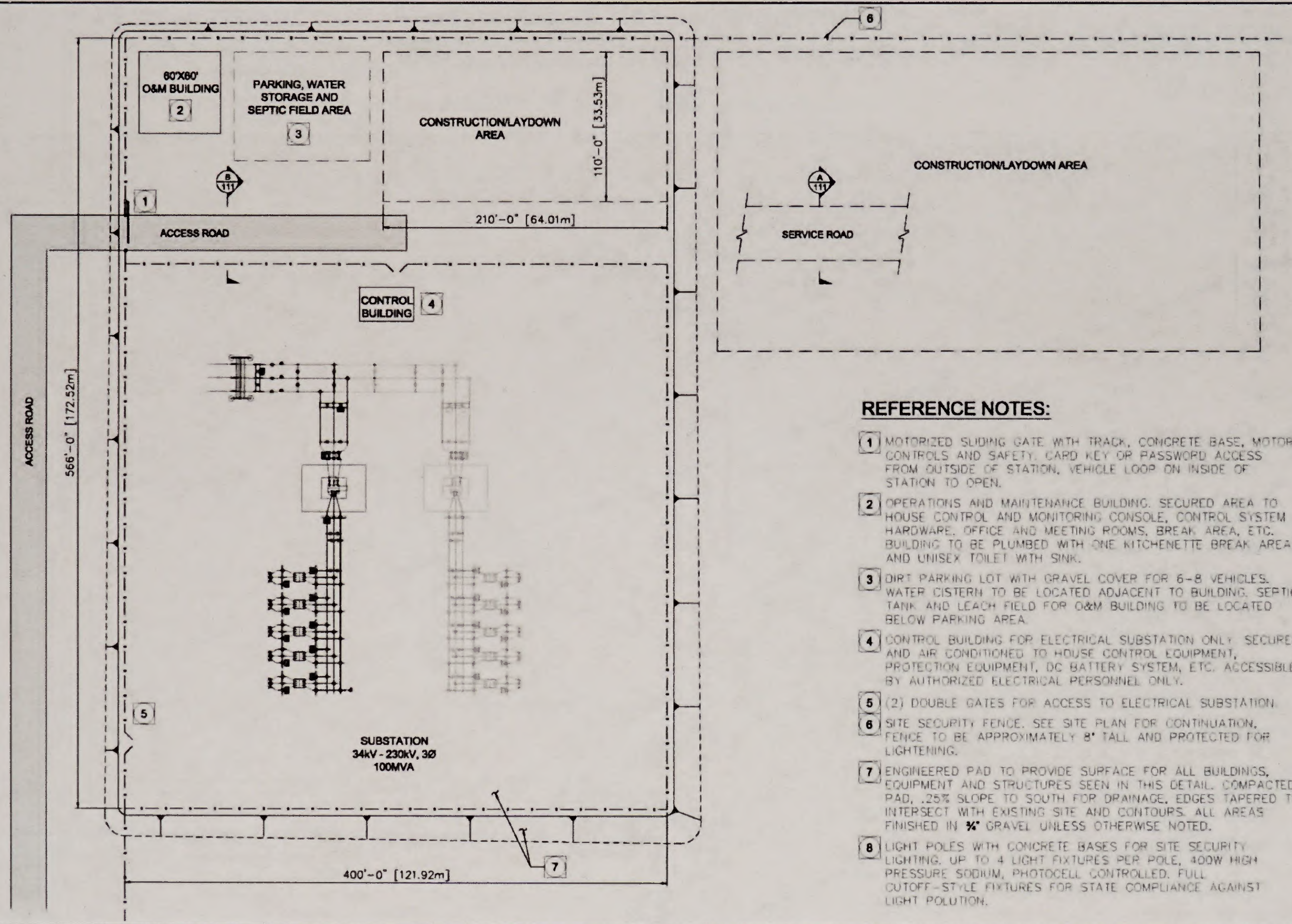
Typical Module Specifications



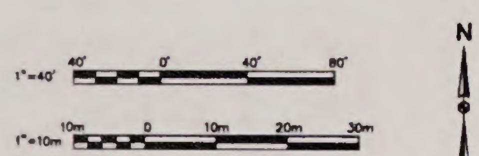
Source: EDF, 2016.

Figure 2-6

Typical Tracker Specifications



Source: EDF, 2016.



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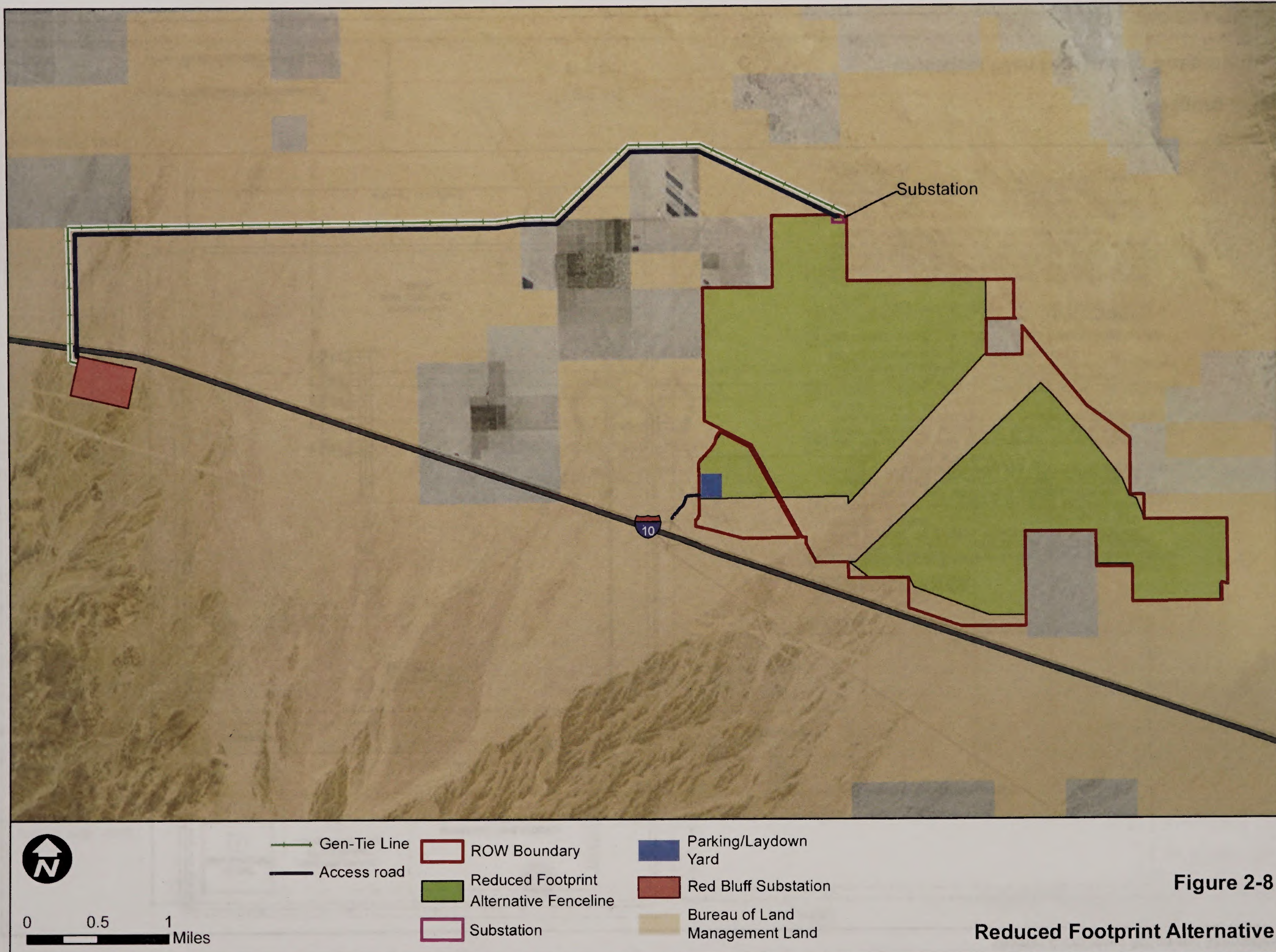

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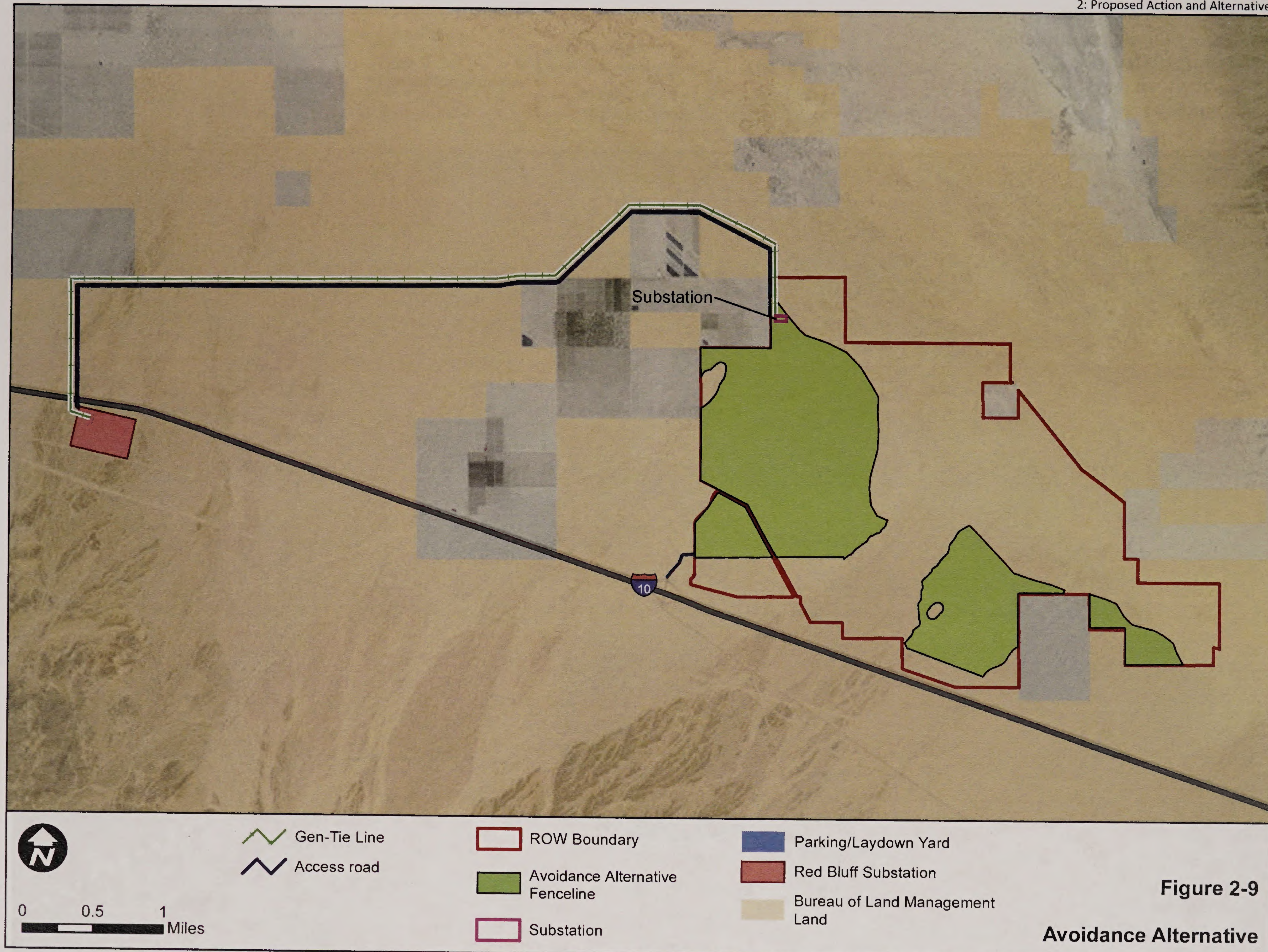

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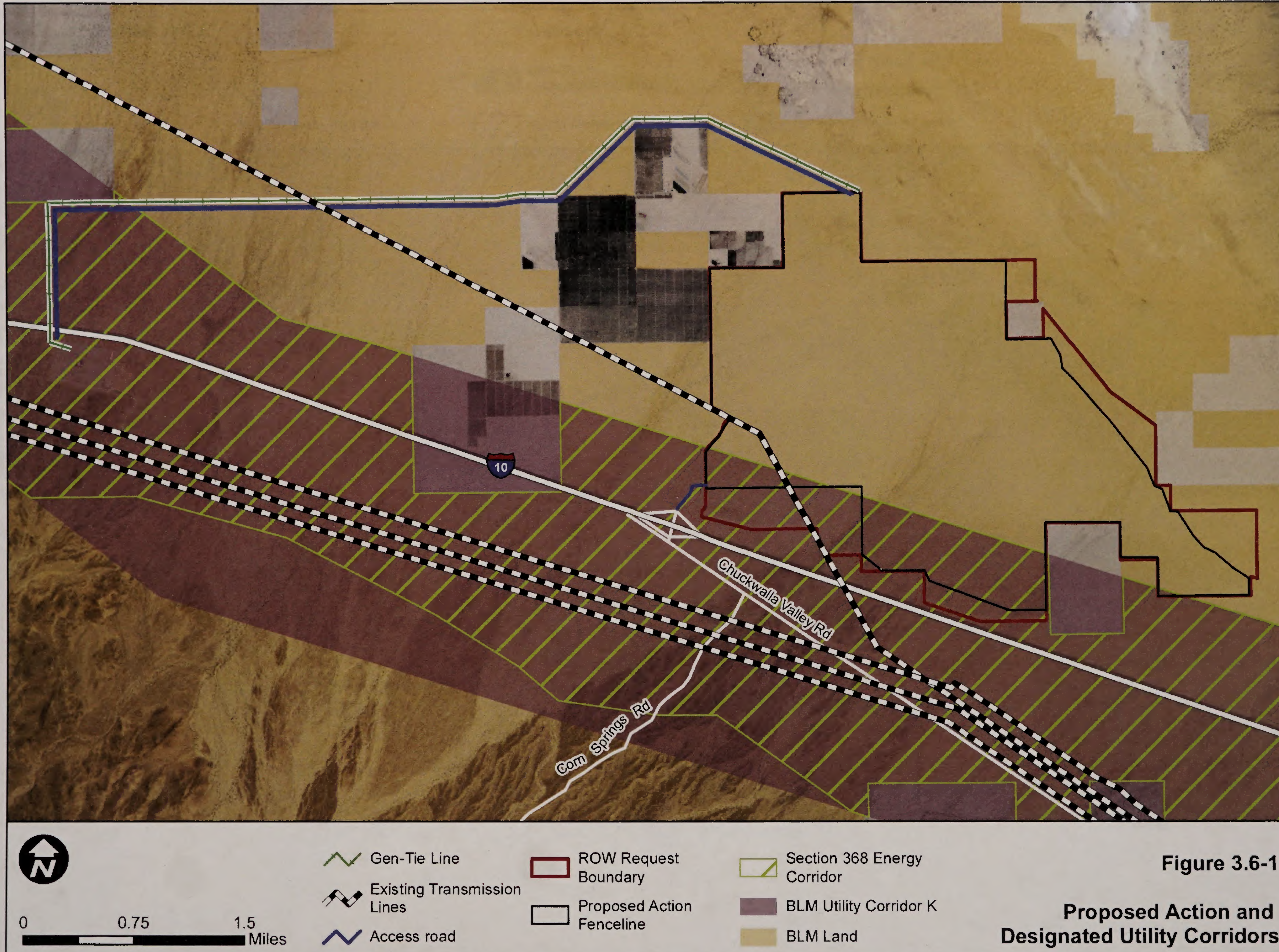

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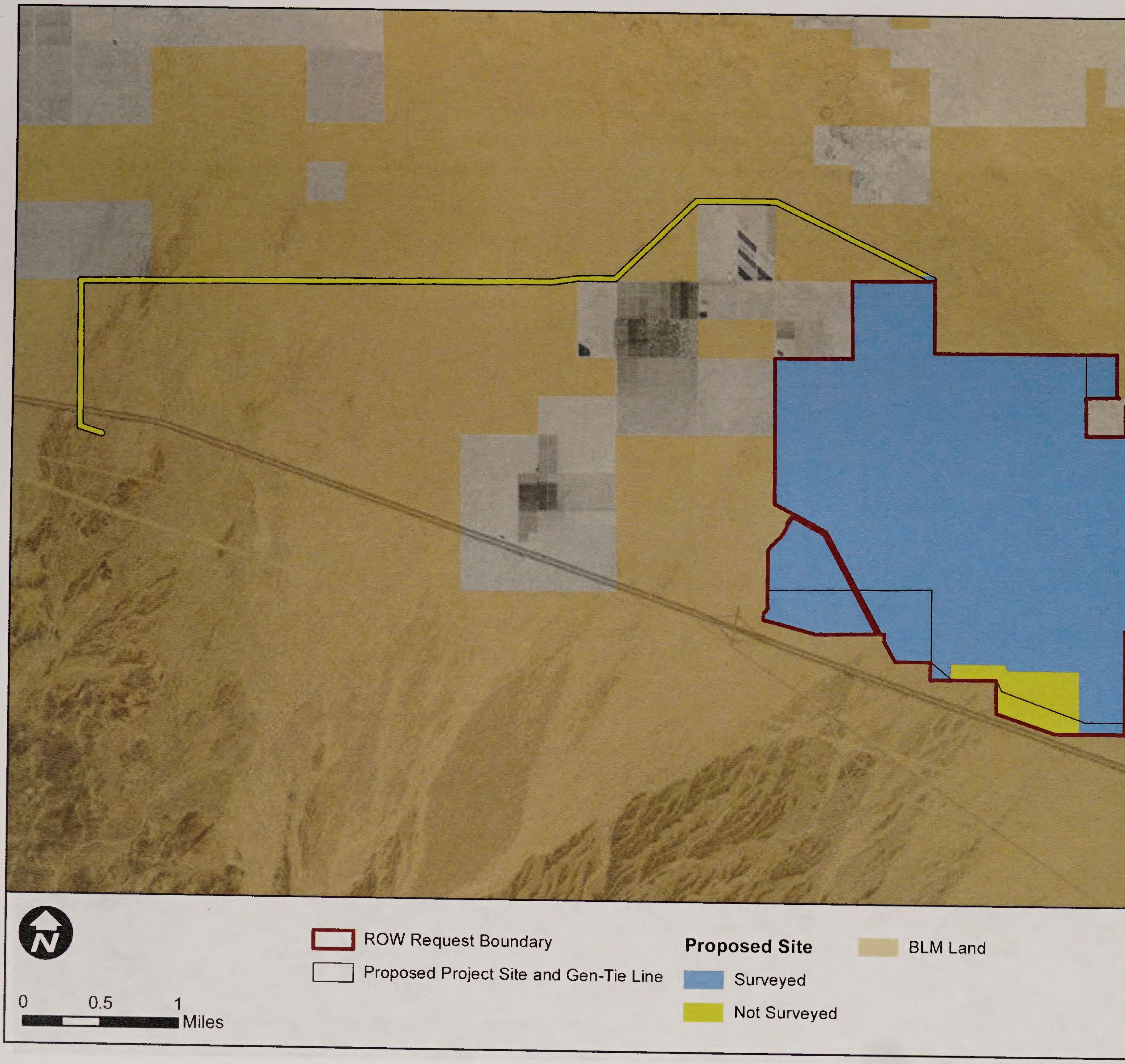
Proposed Action and Designated Utility Corridors



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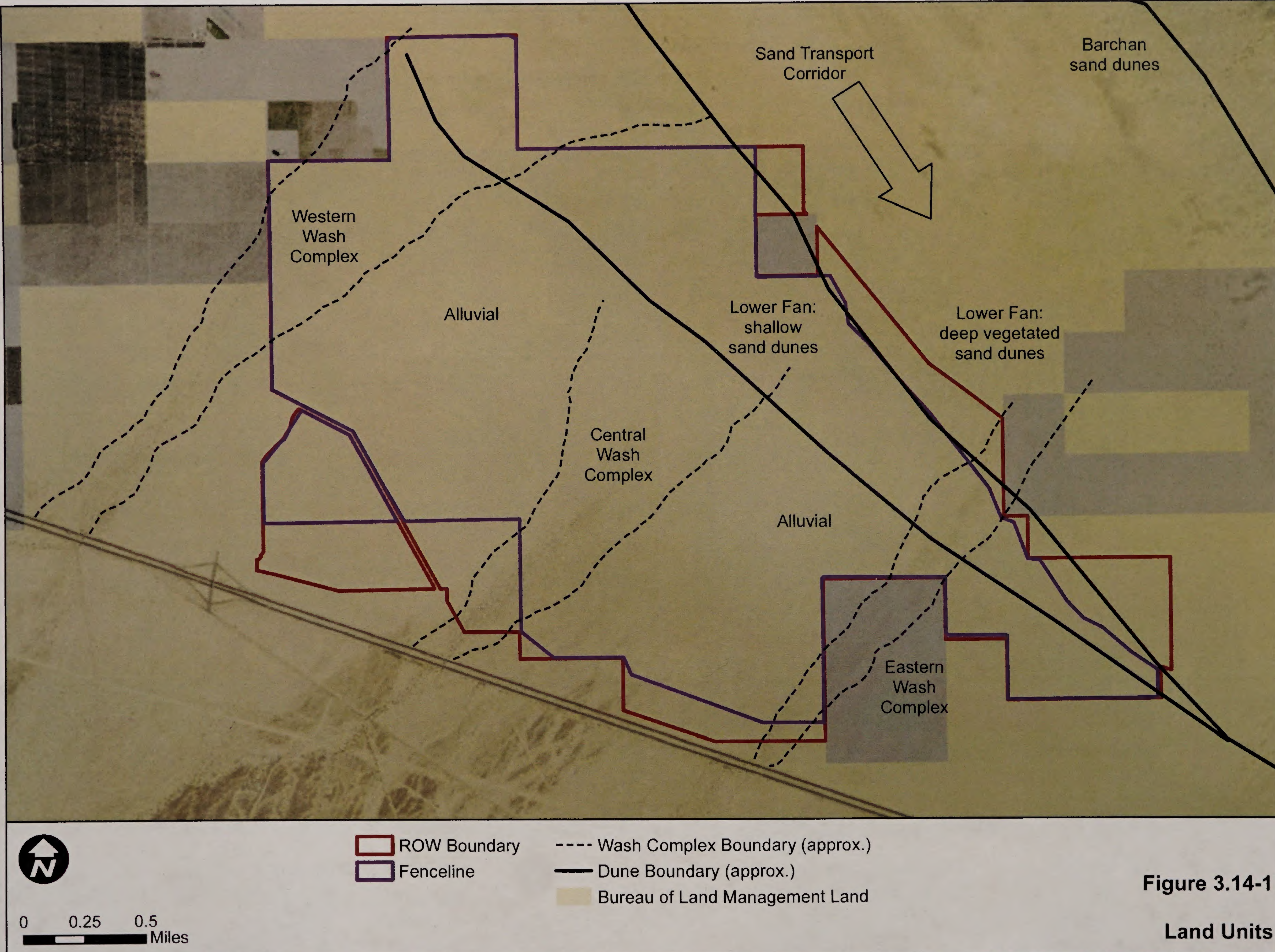

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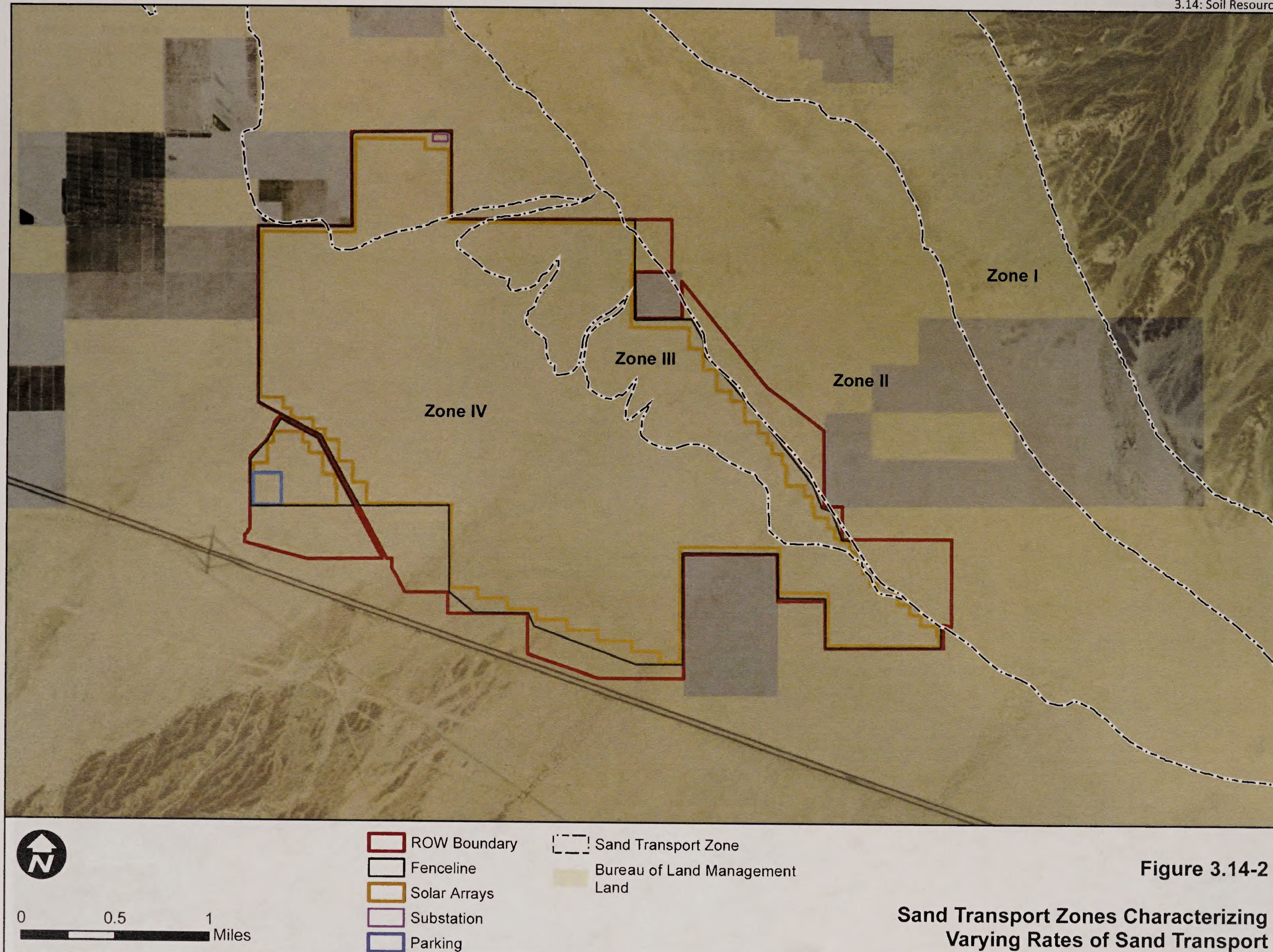
Land Units



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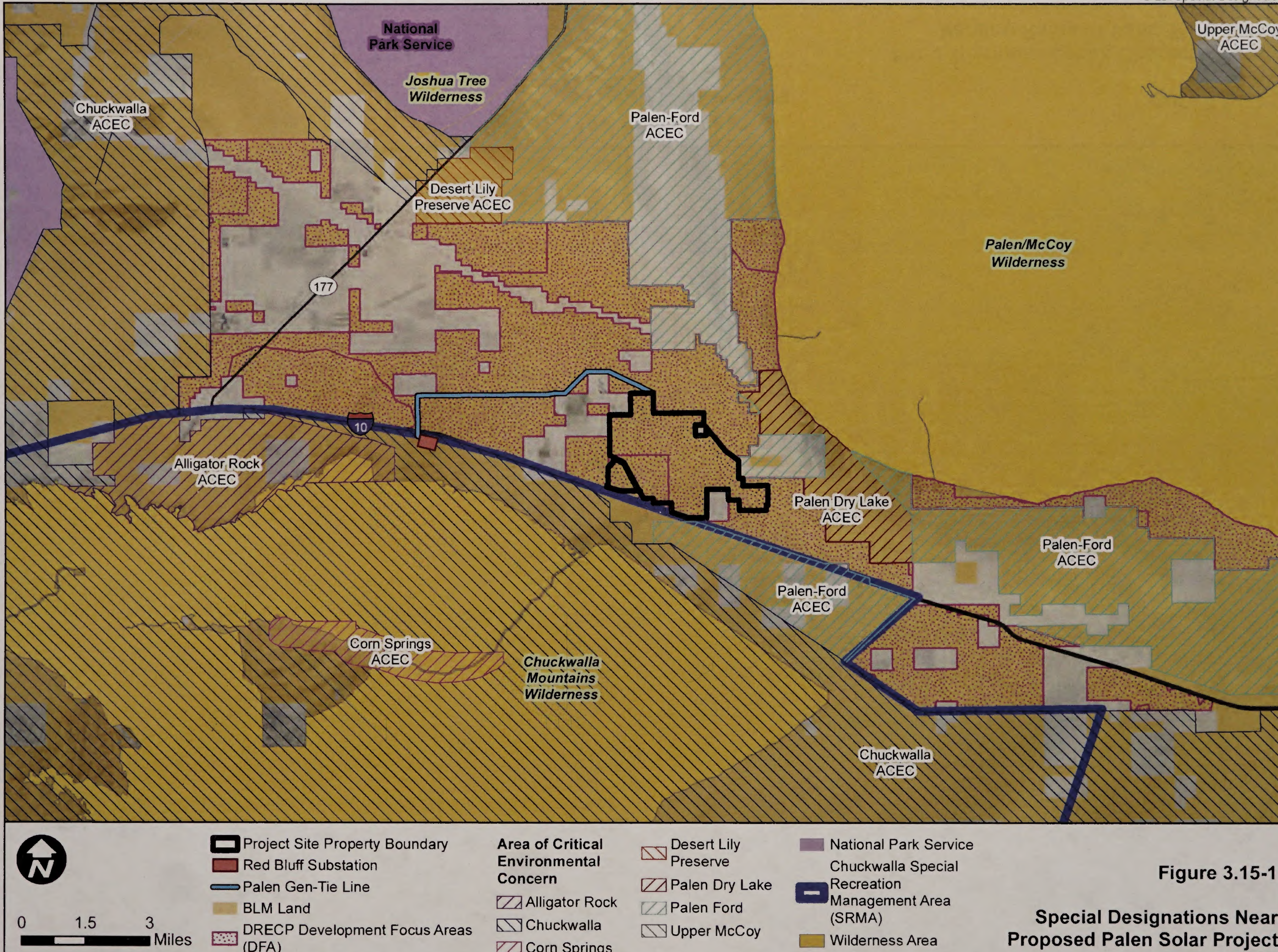

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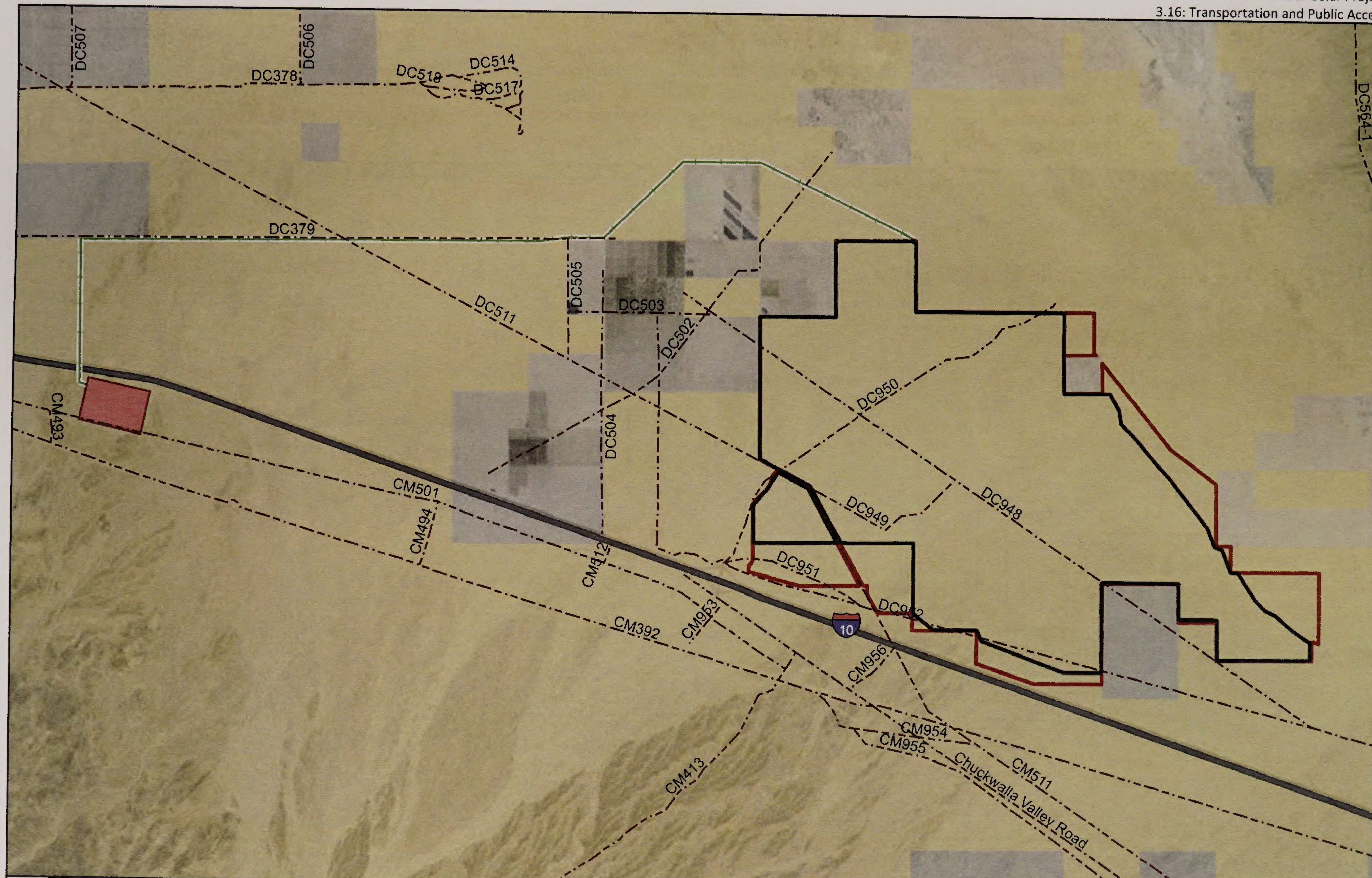
Special Designations Near Proposed Palen Solar Project



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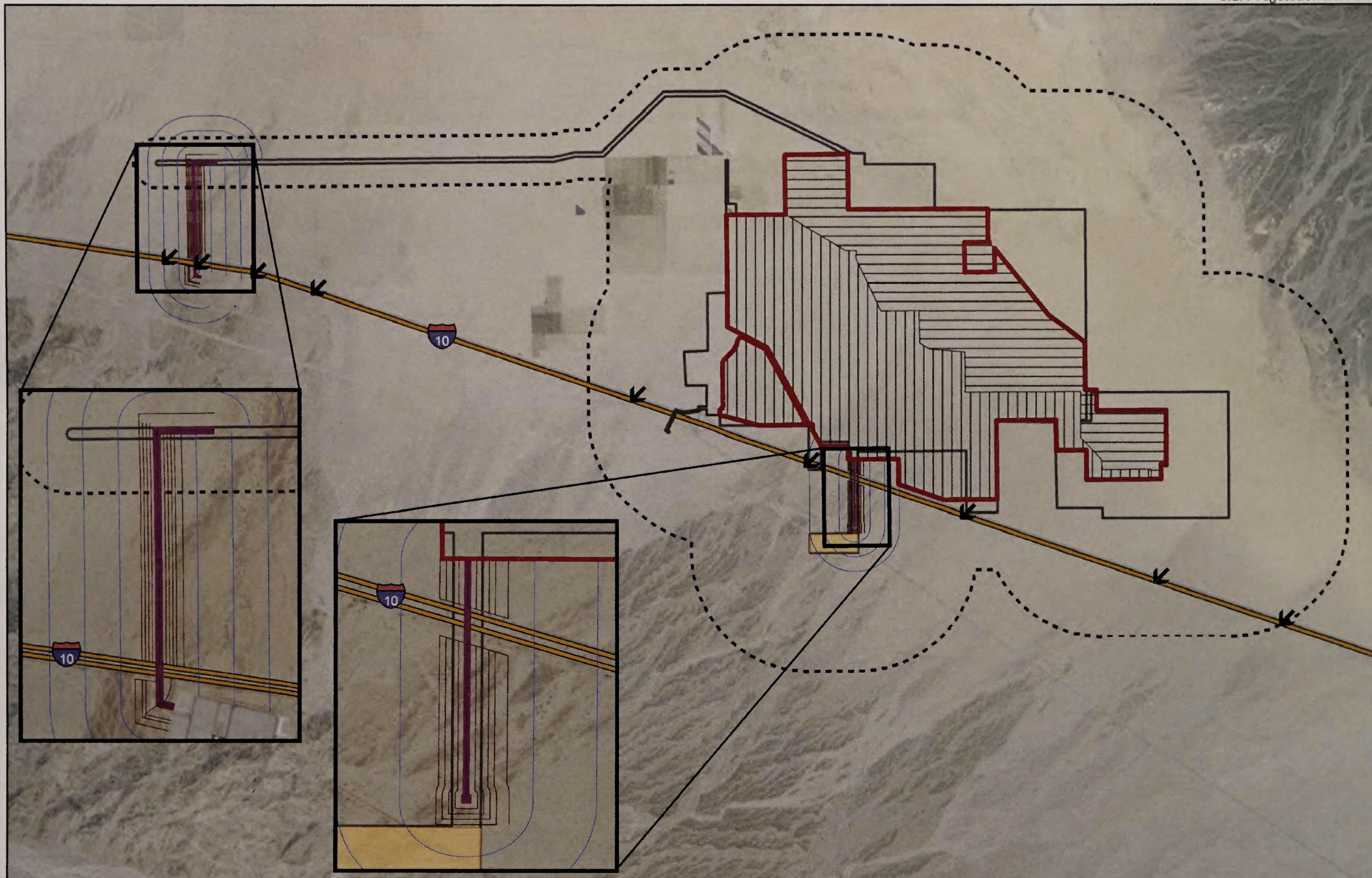
Off-Highway Vehicle Routes in the Project Vicinity



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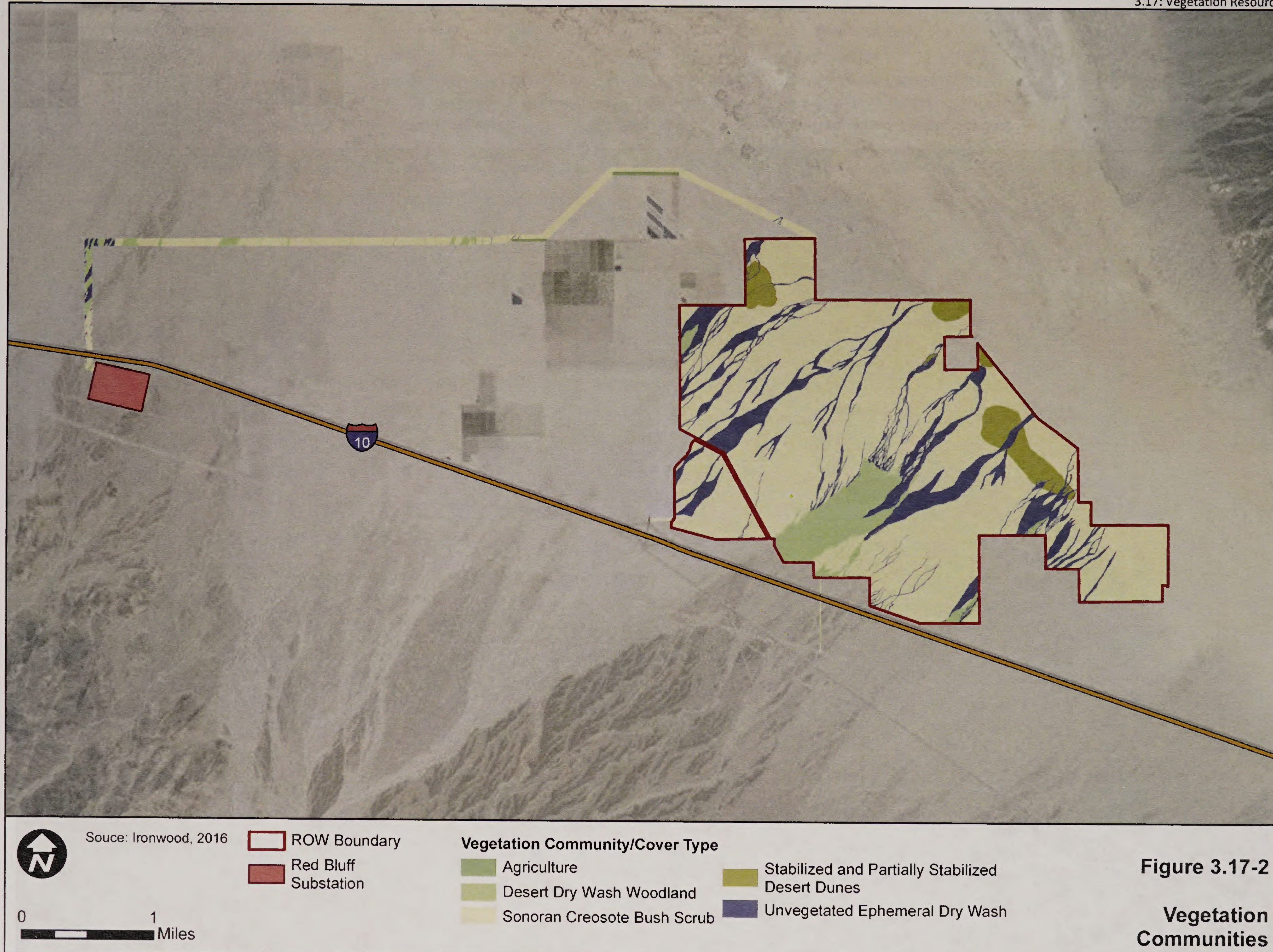
Study Areas 2009-2016



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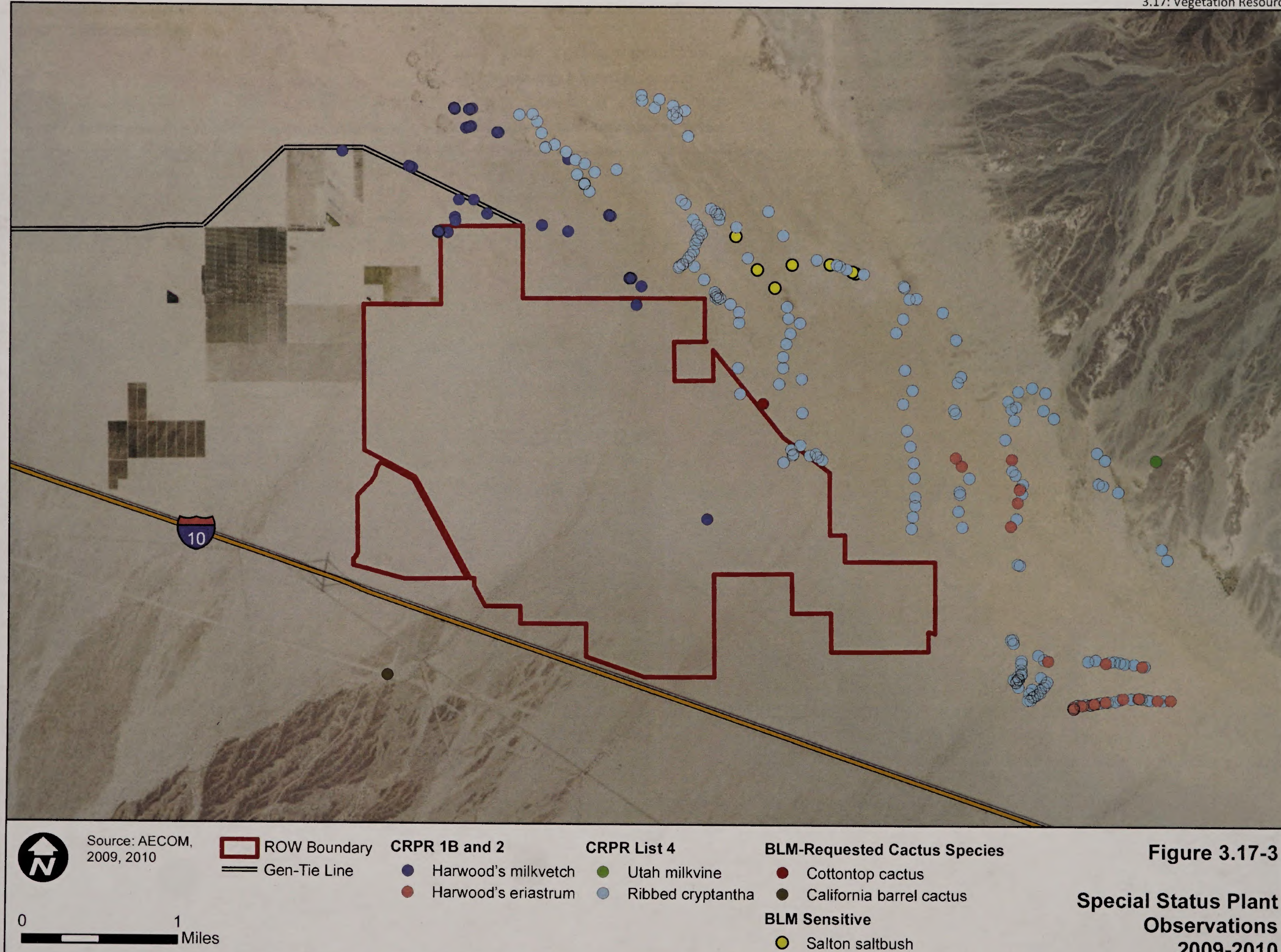
Vegetation Communities



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Special Status Plant Observations 2009-2010

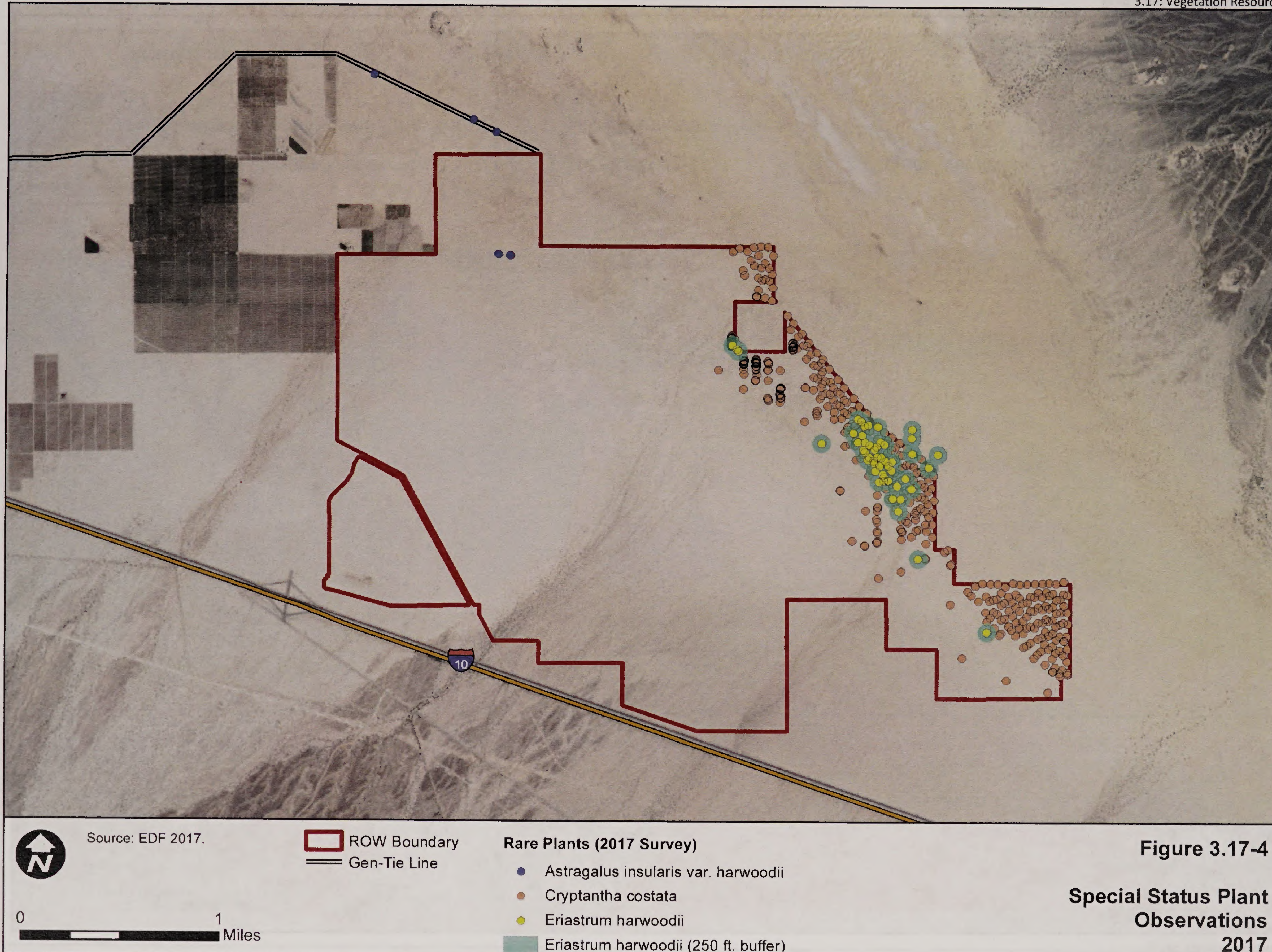
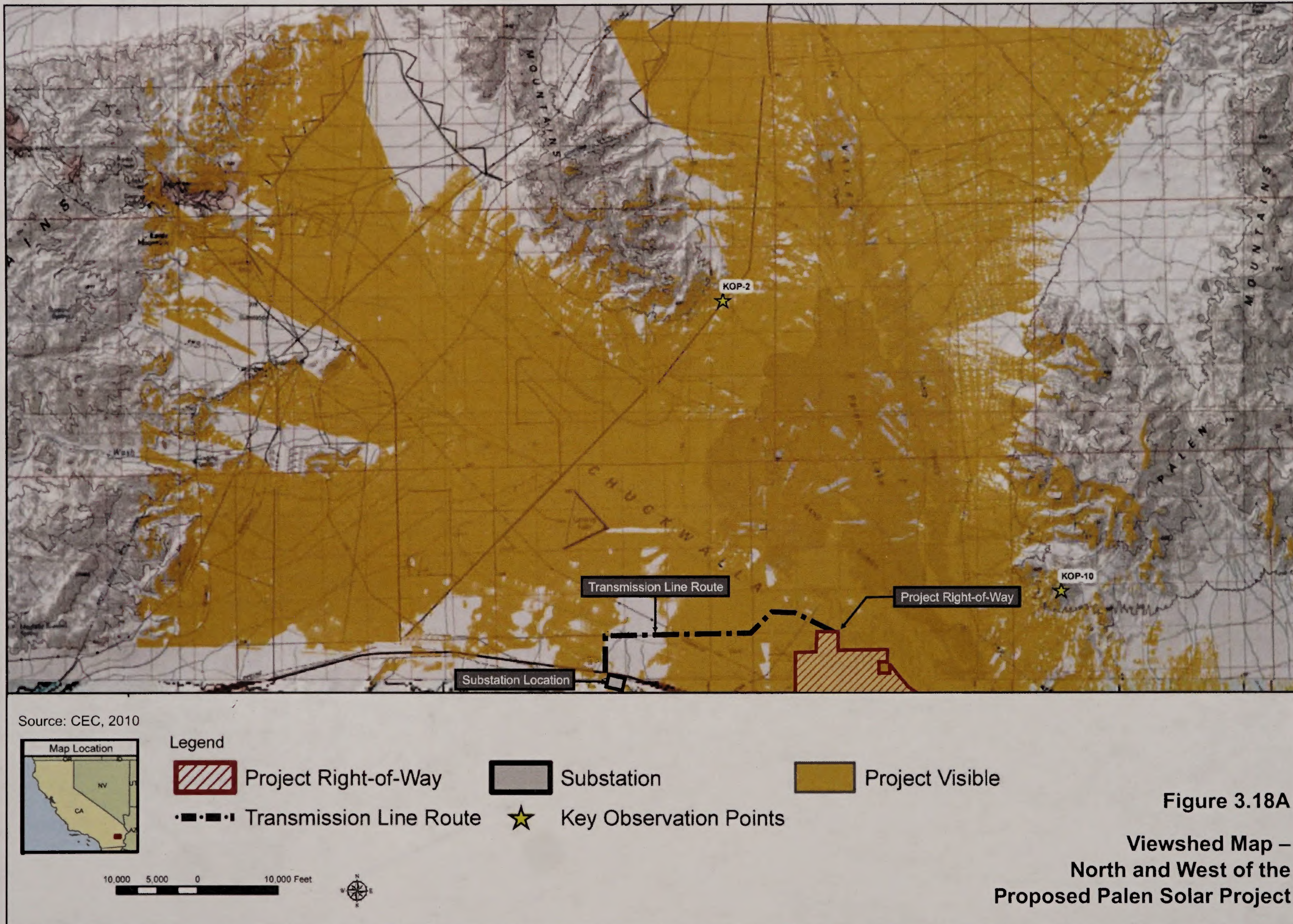


Figure 3.17-4

Special Status Plant Observations 2017



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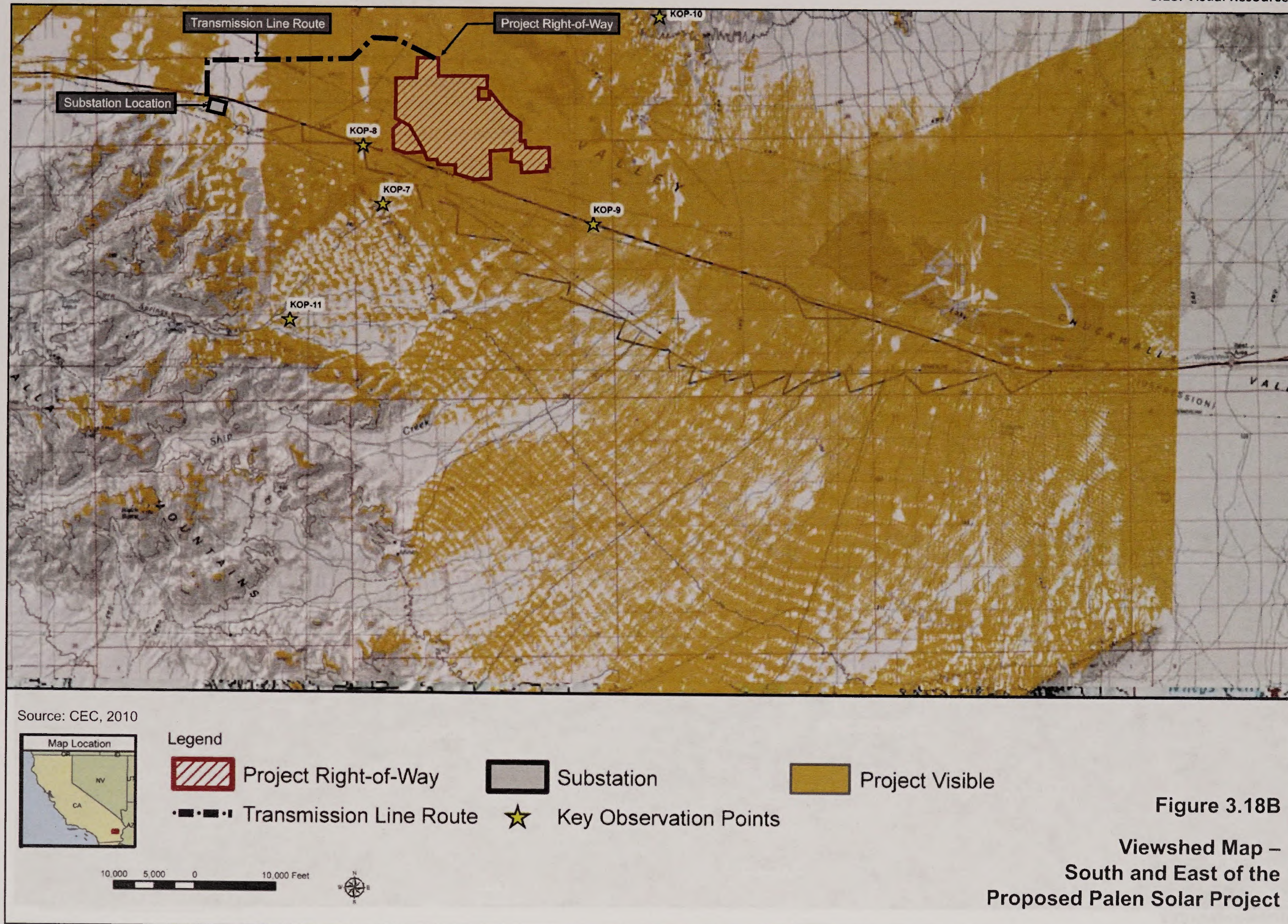
Viewshed Map – North and West of the Proposed Palen Solar Project



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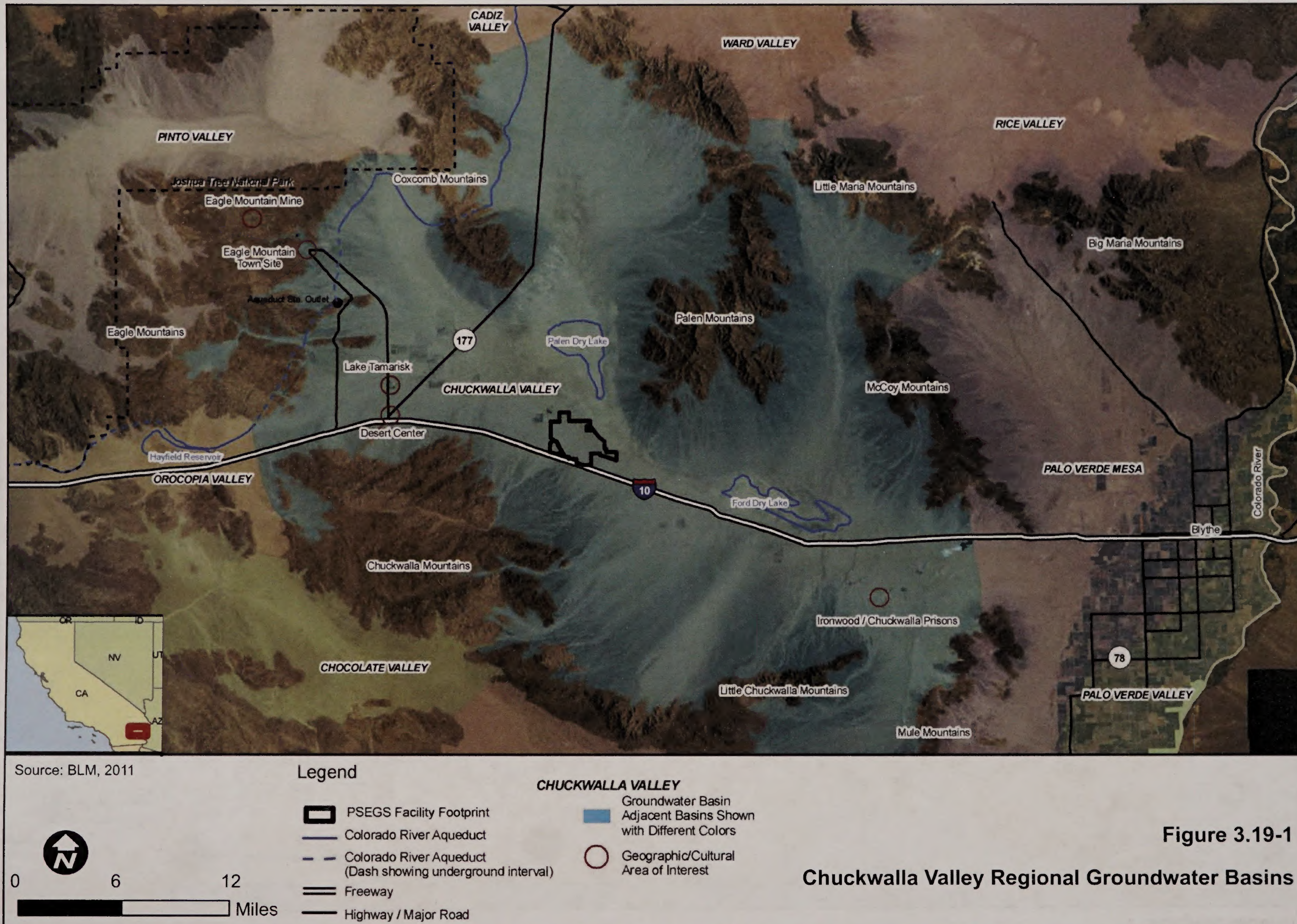


Figure 3.19-1

Chuckwalla Valley Regional Groundwater Basins

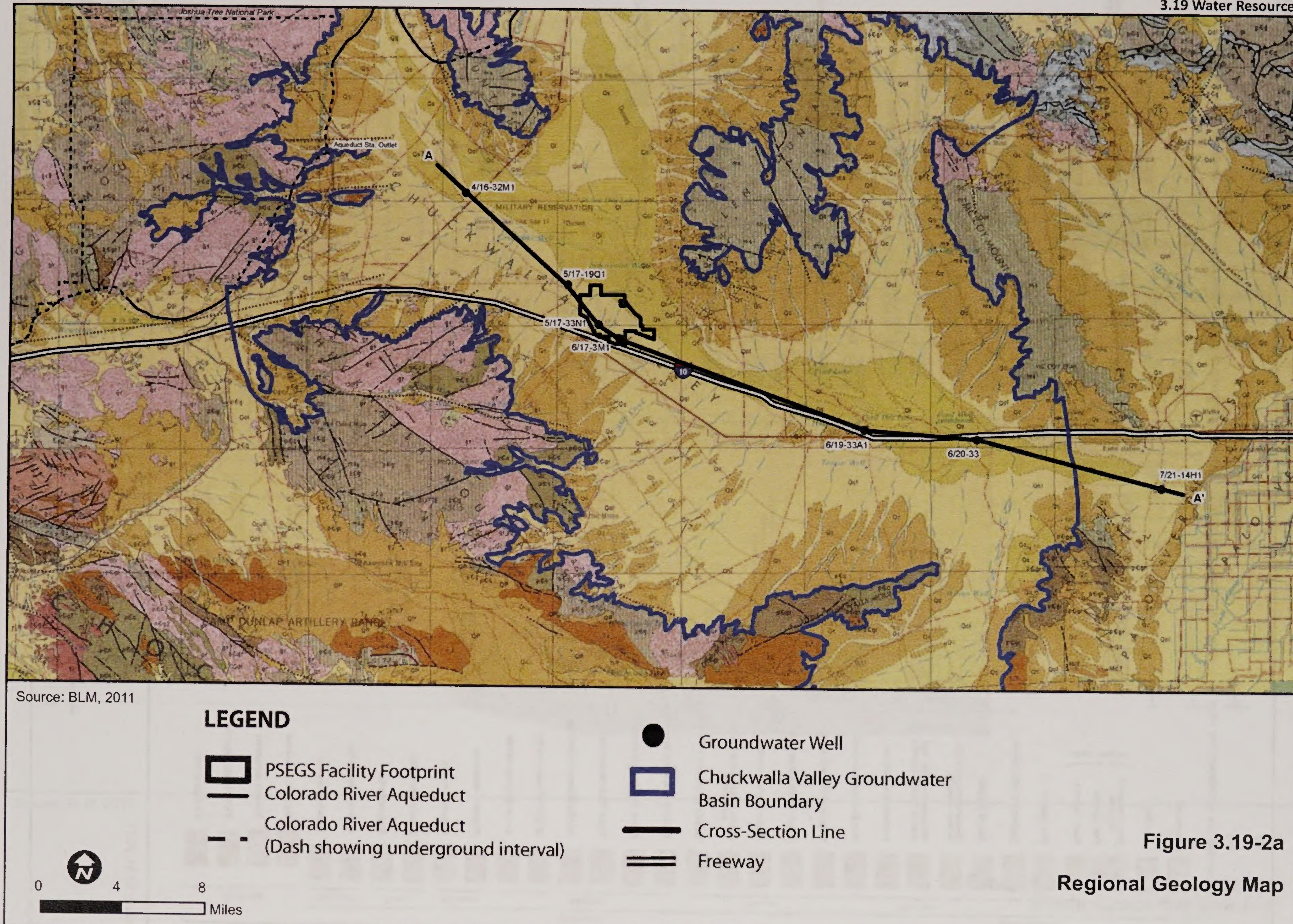
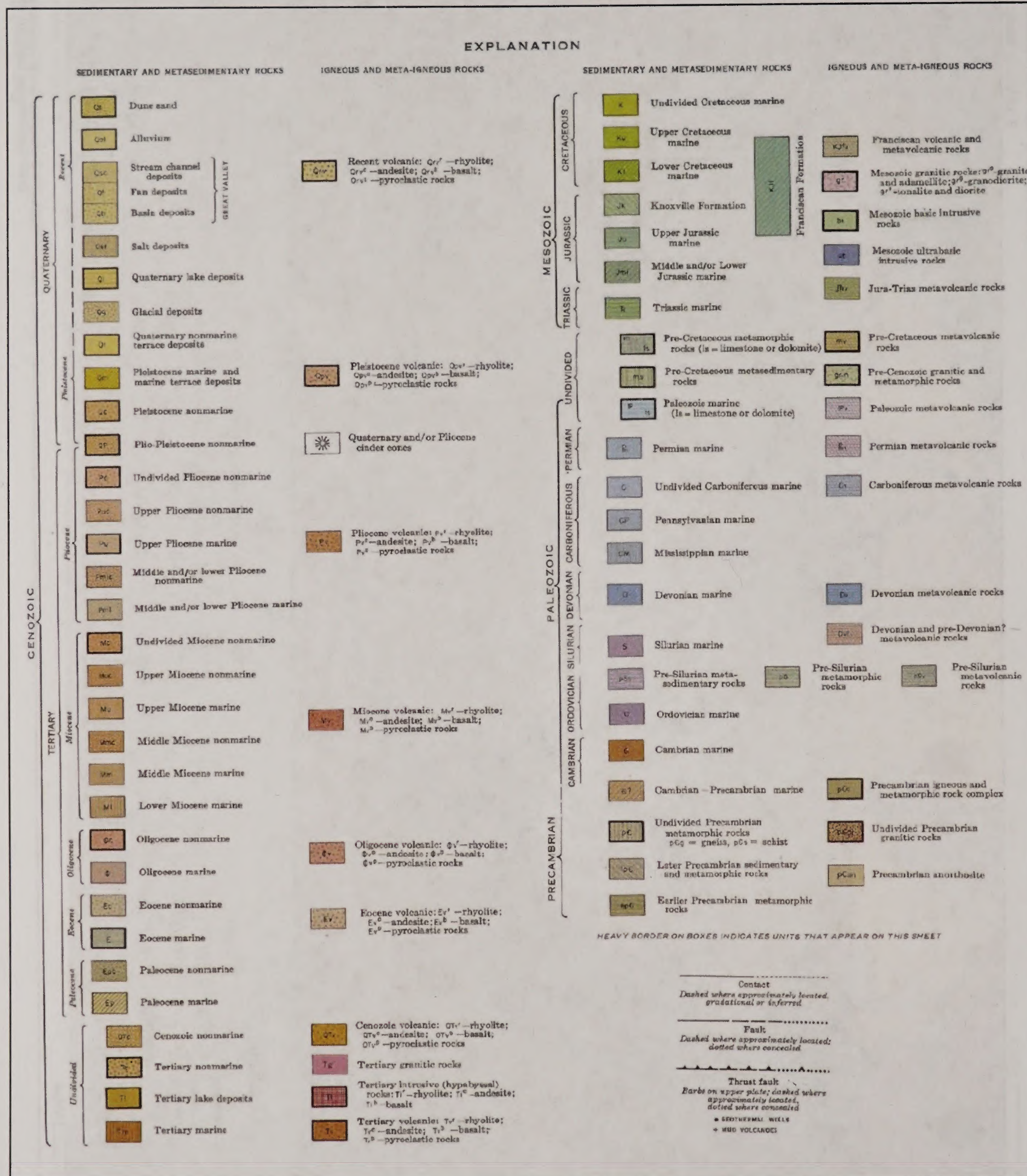


Figure 3.19-2a

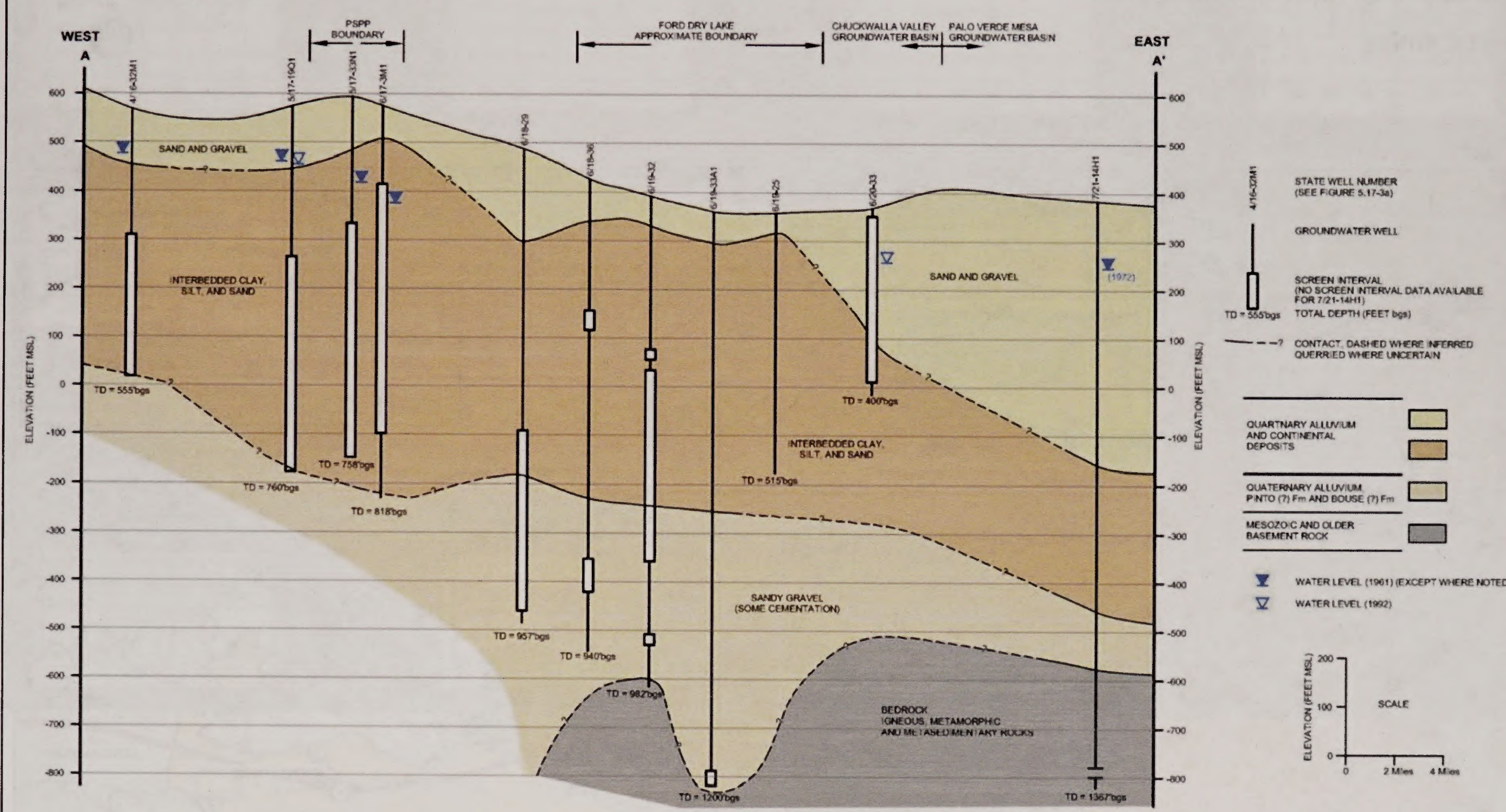
Regional Geology Map



Source: BLM, 2011

Figure 3.19-2b

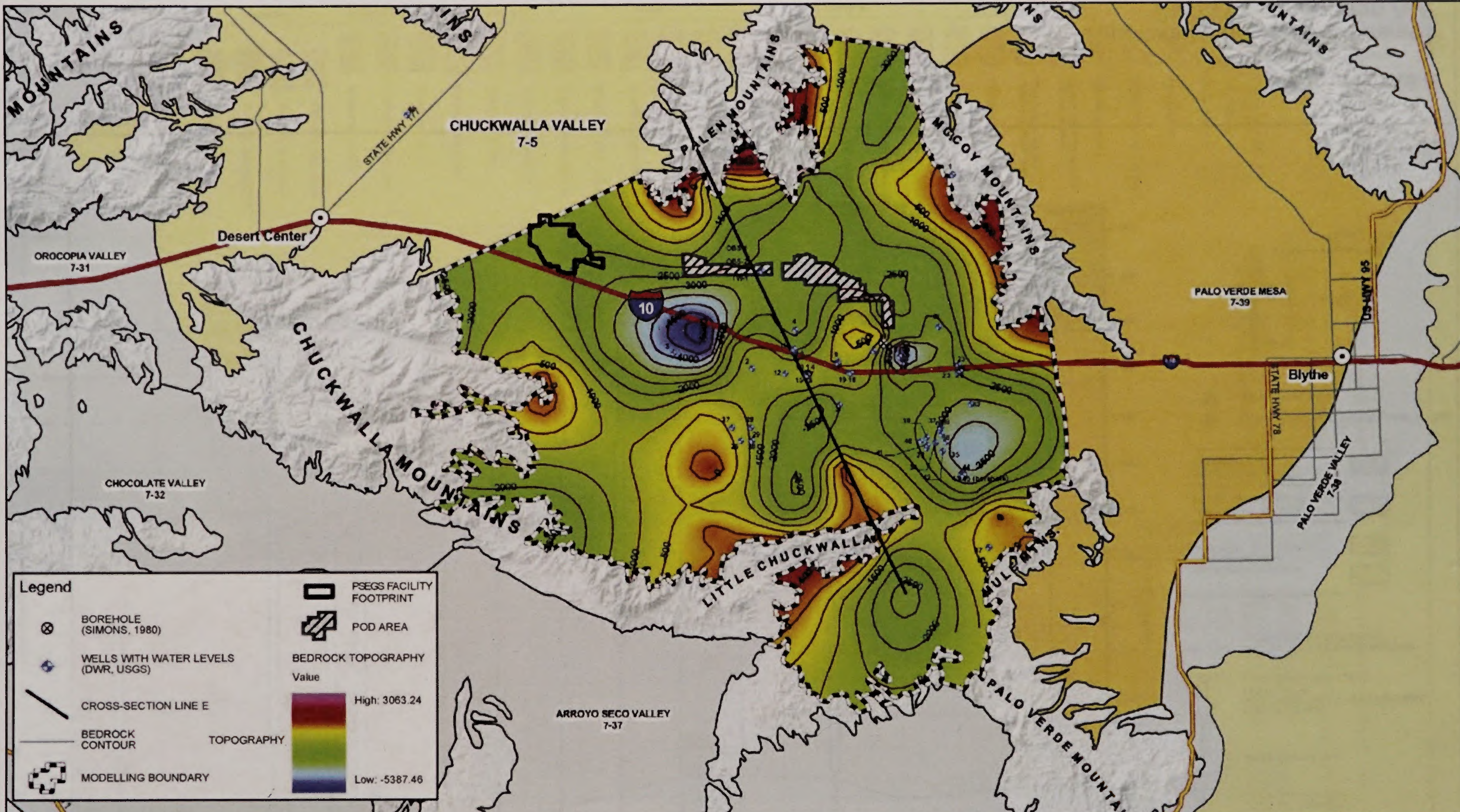
Regional Geology Map Legend



Source: BLM, 2011

Figure 3.19-3

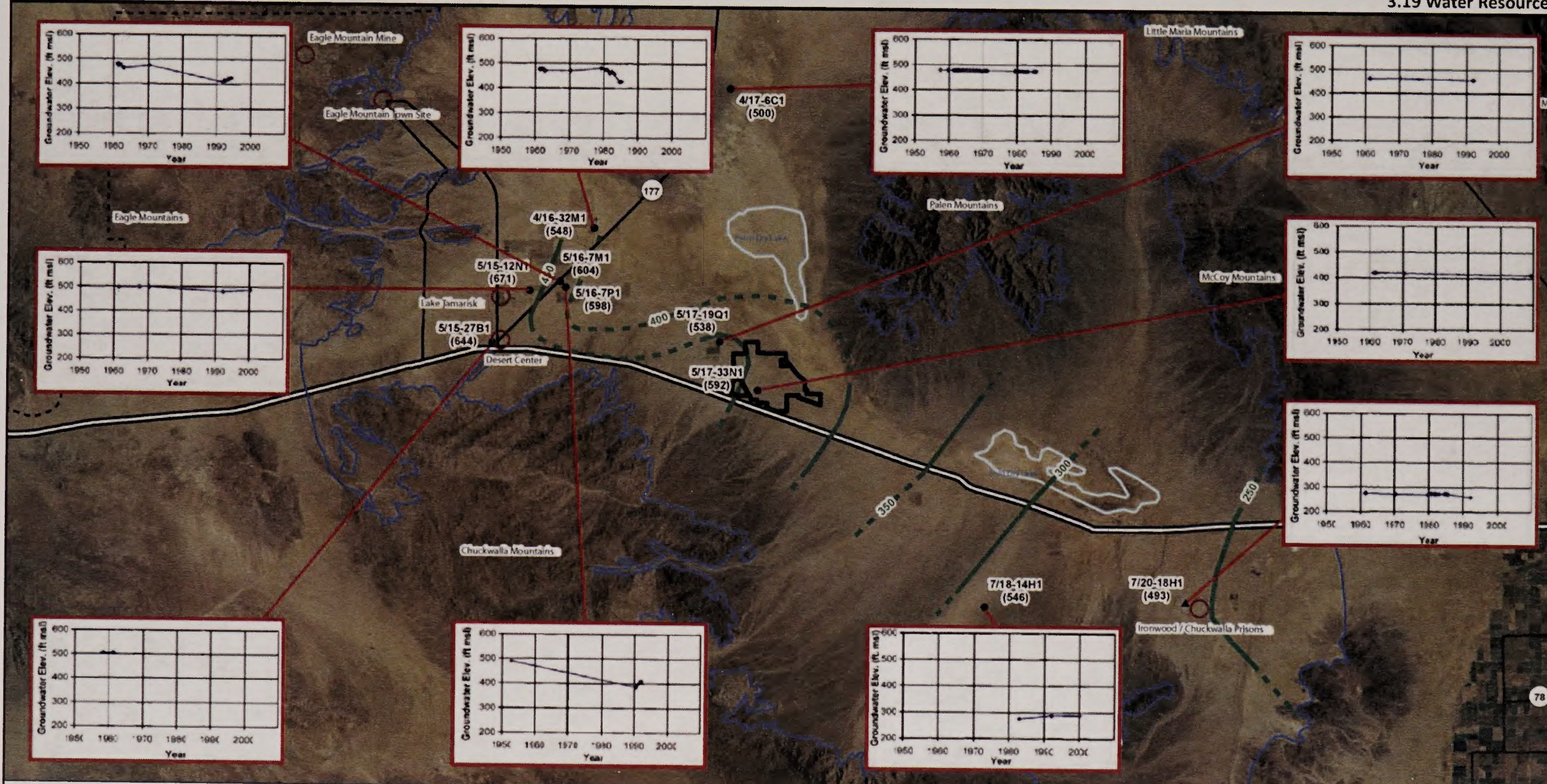
Chuckwalla Valley Groundwater Basin Cross Section A-A'



Source: BLM, 2011

Figure 3.19-4

Chuckwalla Valley Groundwater Basin Bedrock Topography



Source: BLM, 2011

PSEGS Facility Footprint

Chuckwalla Valley Groundwater Basin Boundary

Freeway

Groundwater Well
Location based on Latitude and Longitude in USGS Database

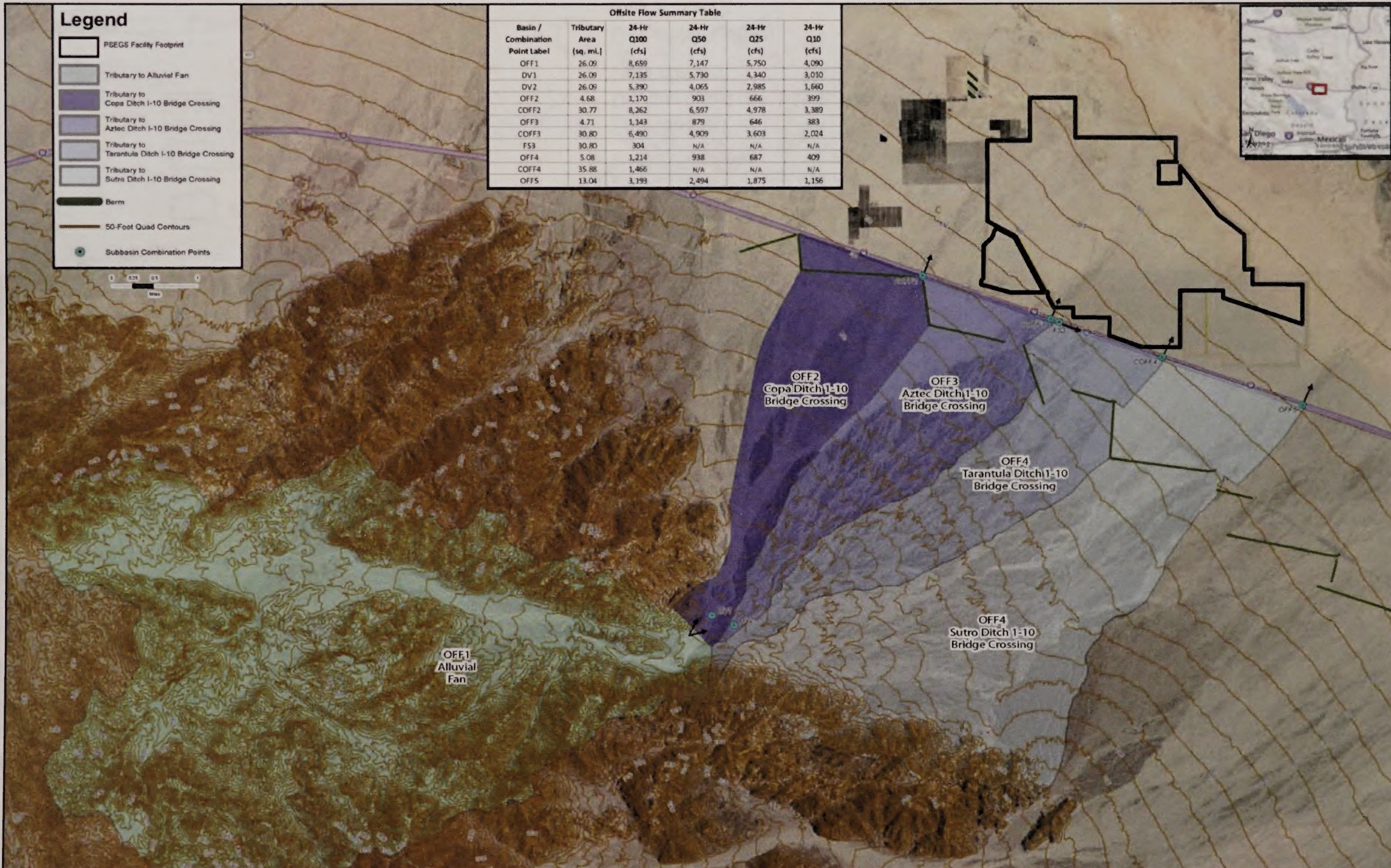
Groundwater Well
Location based on the State Well Number (approximate)

Geographic/Cultural Area of Interest

0 4 8 Miles

Figure 3.19-5

Basin Wide Groundwater Hydrographs



Offsite Flow Summary Table

Basin / Combination Point Label	Tributary Area (sq. mi.)	24-Hr Q100 (cfs)	24-Hr Q50 (cfs)	24-Hr Q25 (cfs)	24-Hr Q10 (cfs)
OFF1	26.09	8,659	7,147	5,750	4,090
DV1	26.09	7,135	5,730	4,340	3,010
DV2	26.09	5,390	4,065	2,985	1,660
OFF2	4.68	1,170	903	666	399
COFF2	30.77	8,262	6,597	4,978	3,389
OFF3	4.71	1,143	879	646	383
COFF3	30.80	6,490	4,909	3,603	2,024
FS3	30.80	304	N/A	N/A	N/A
OFF4	5.08	1,214	938	687	409
COFF4	35.88	1,466	N/A	N/A	N/A
OFF5	13.04	3,193	2,494	1,875	1,156

Source: BLM, 2011

Figure 3.19-6

Watershed Map

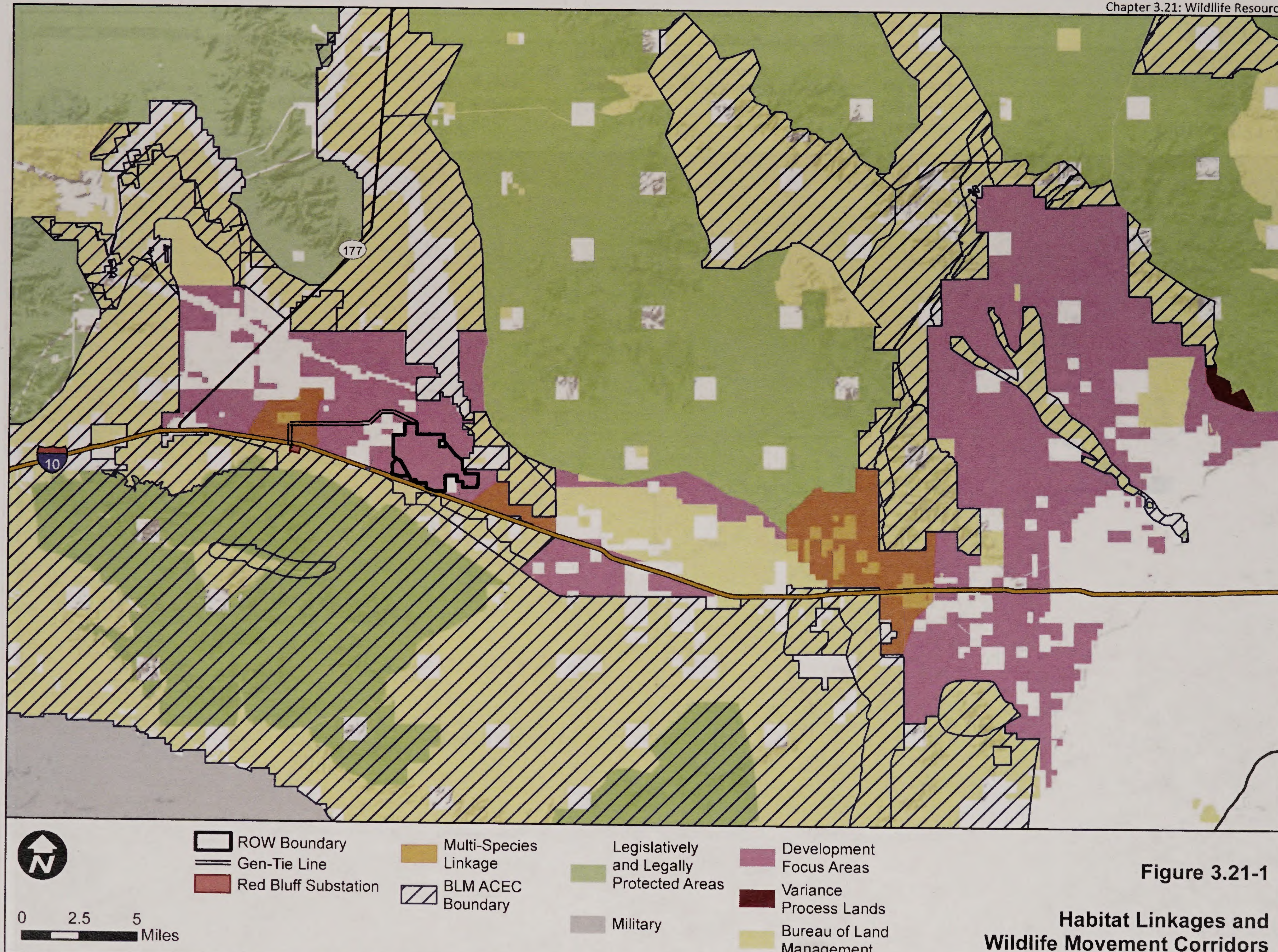


Figure 3.21-1

Habitat Linkages and Wildlife Movement Corridors

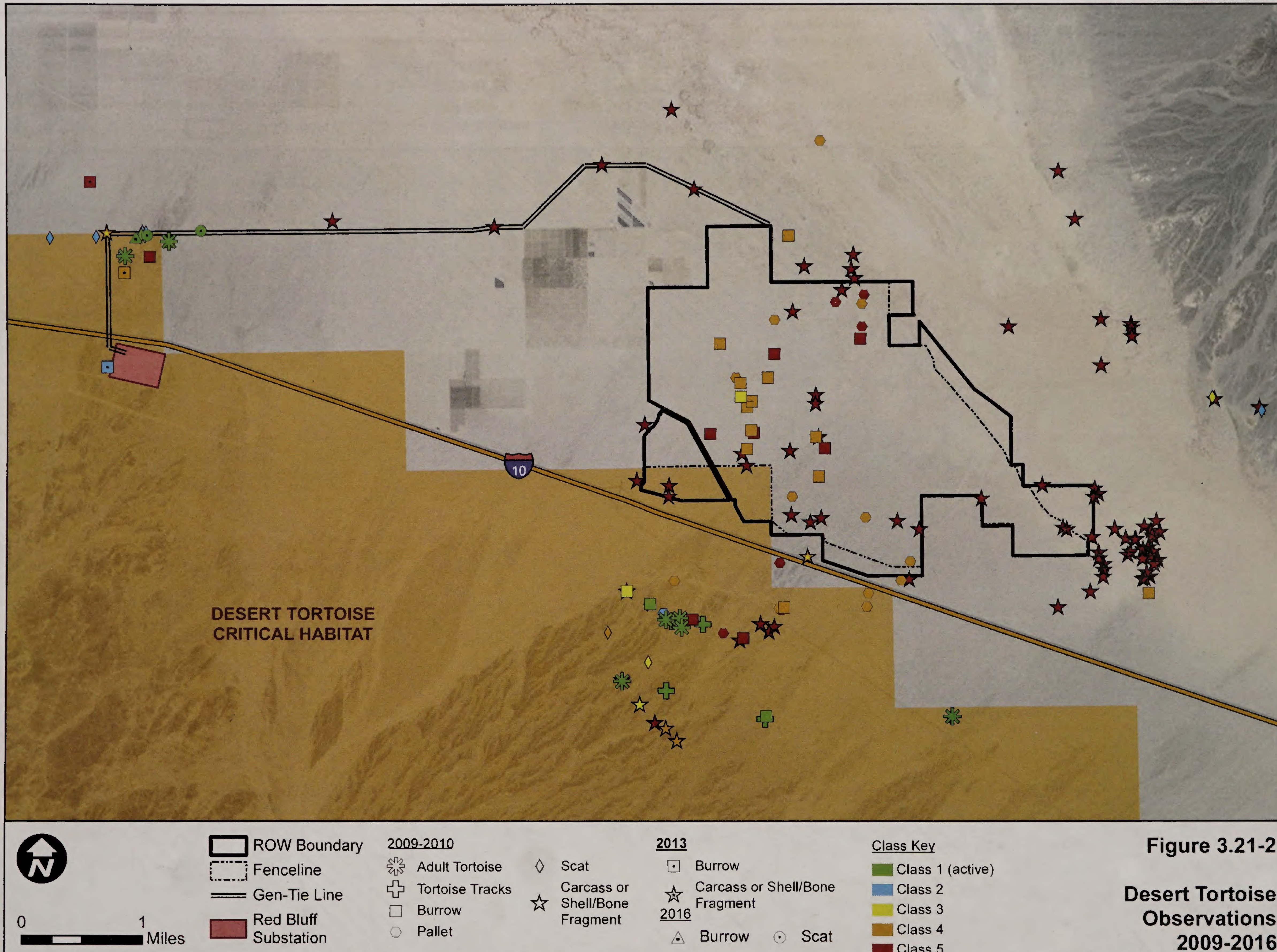
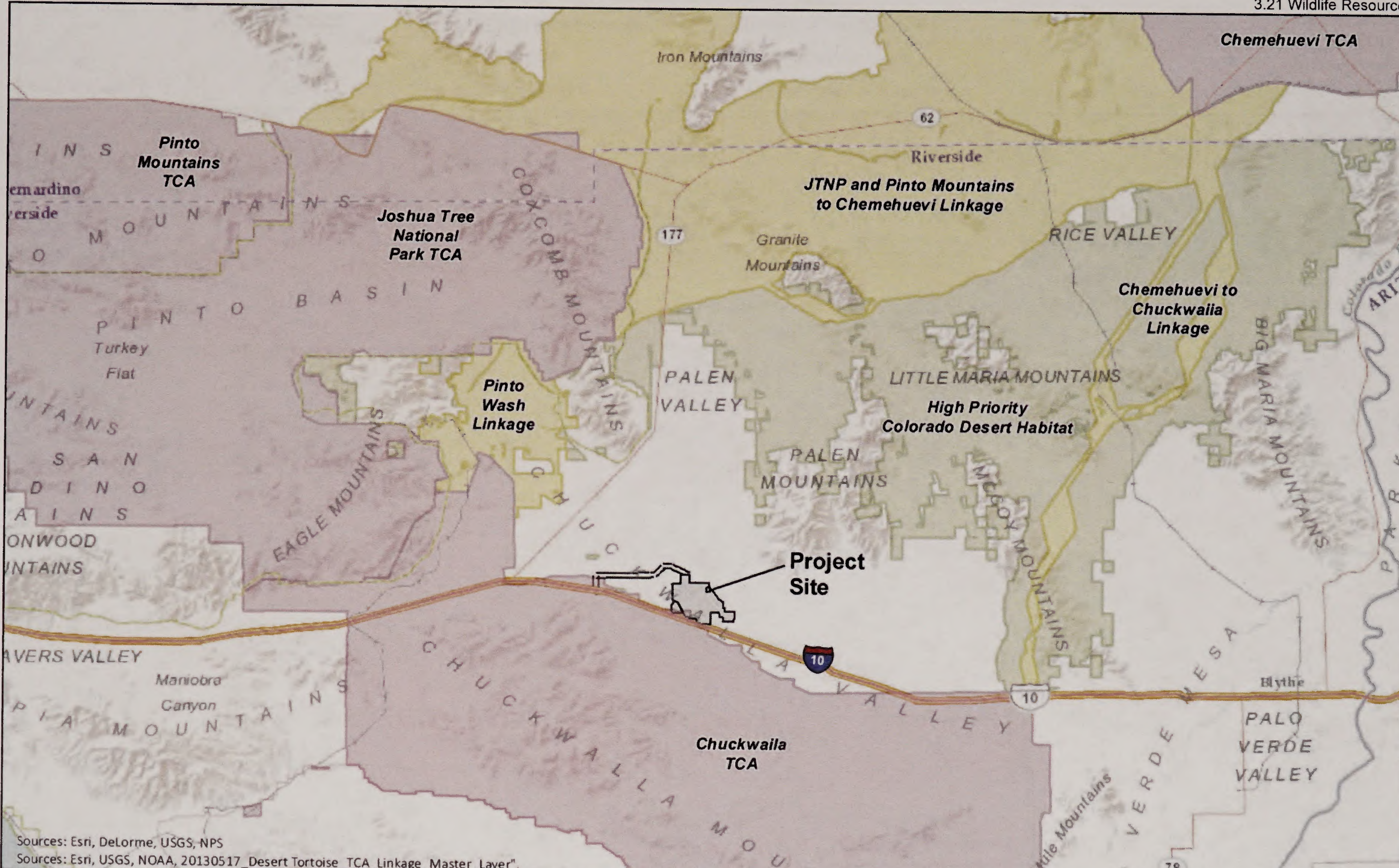


Figure 3.21-2

Desert Tortoise Observations 2009-2016



Source: Ironwood, 2016.

Figure 3.21-3

Desert Tortoise Linkages

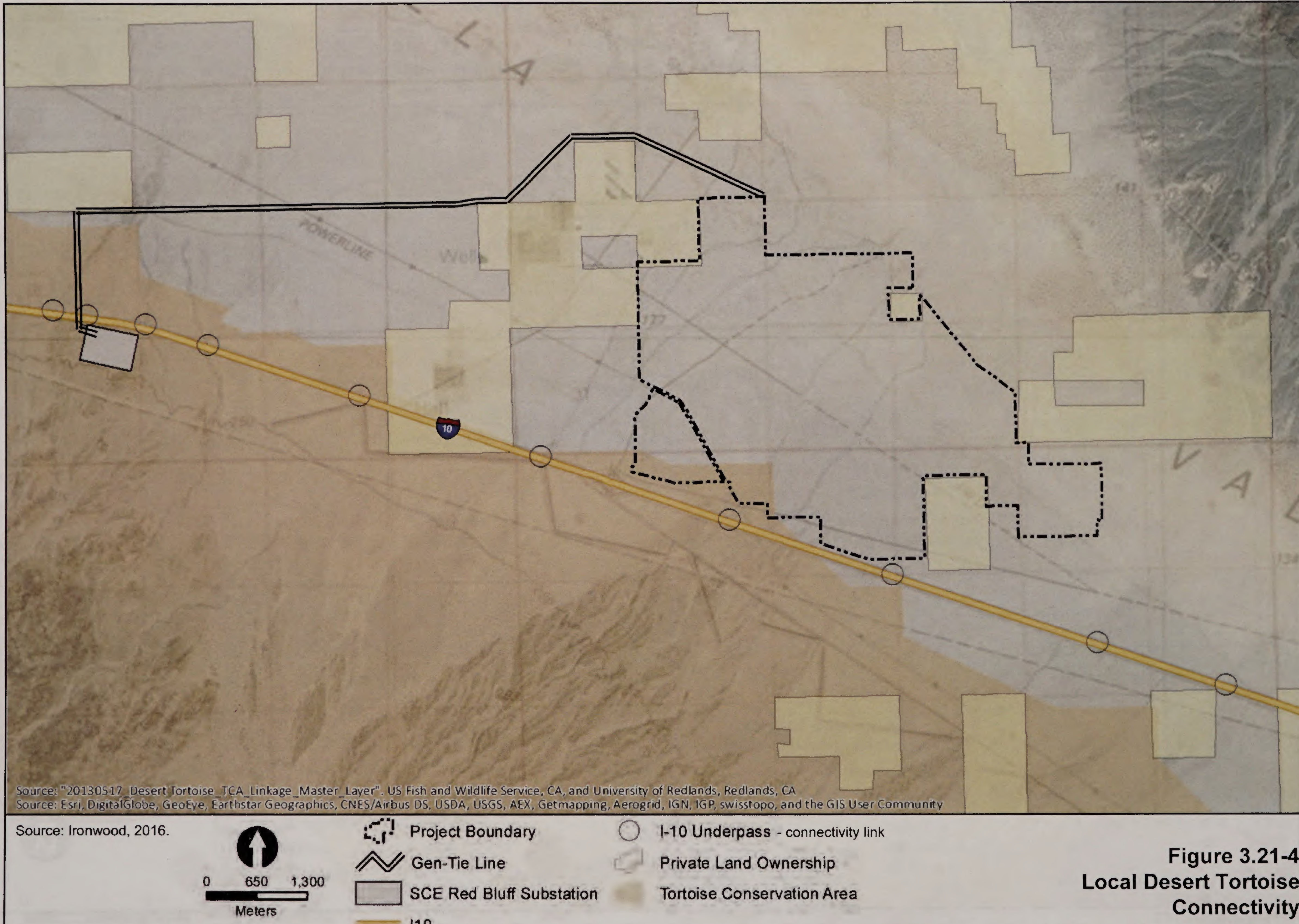


Figure 3.21-4
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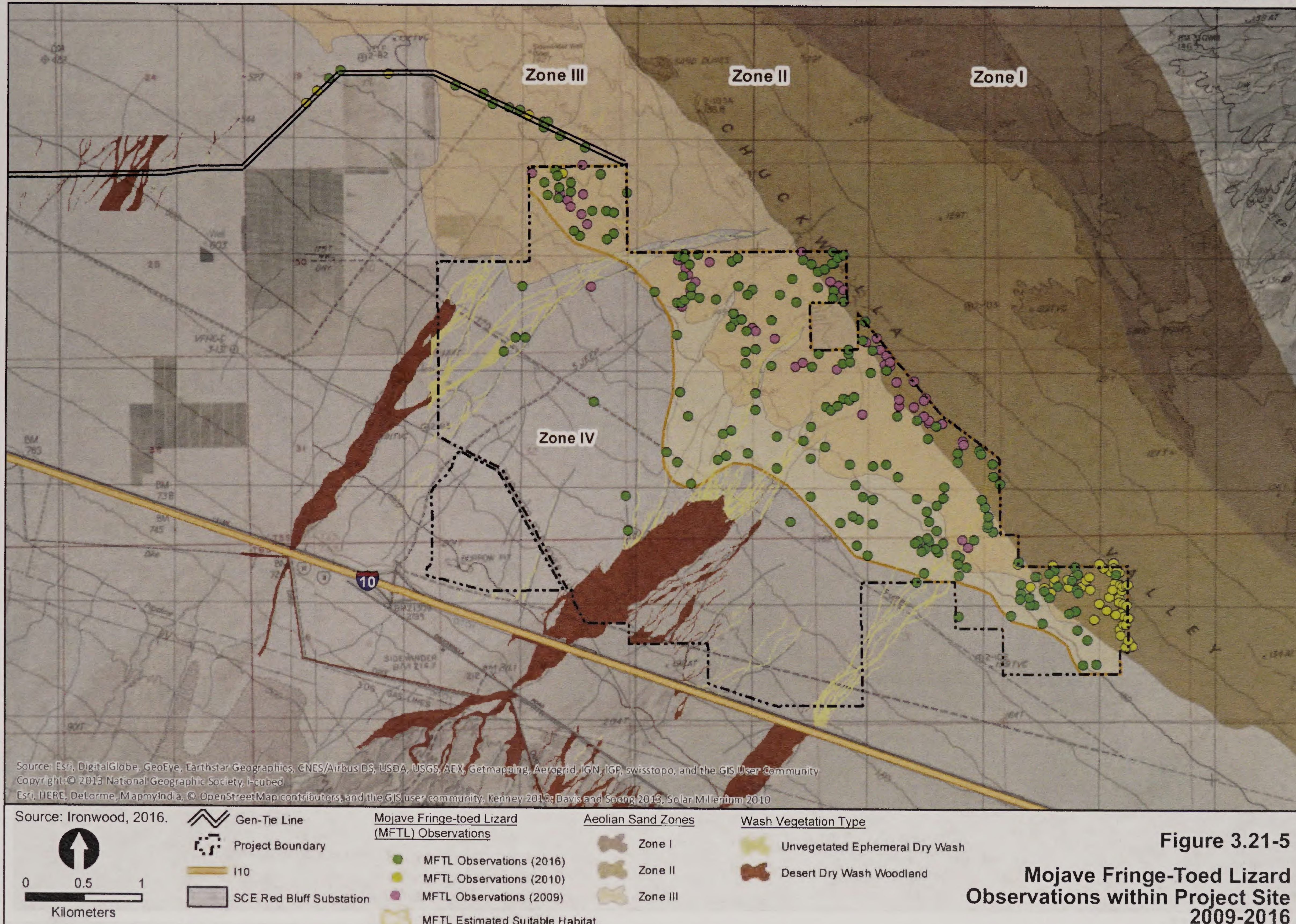
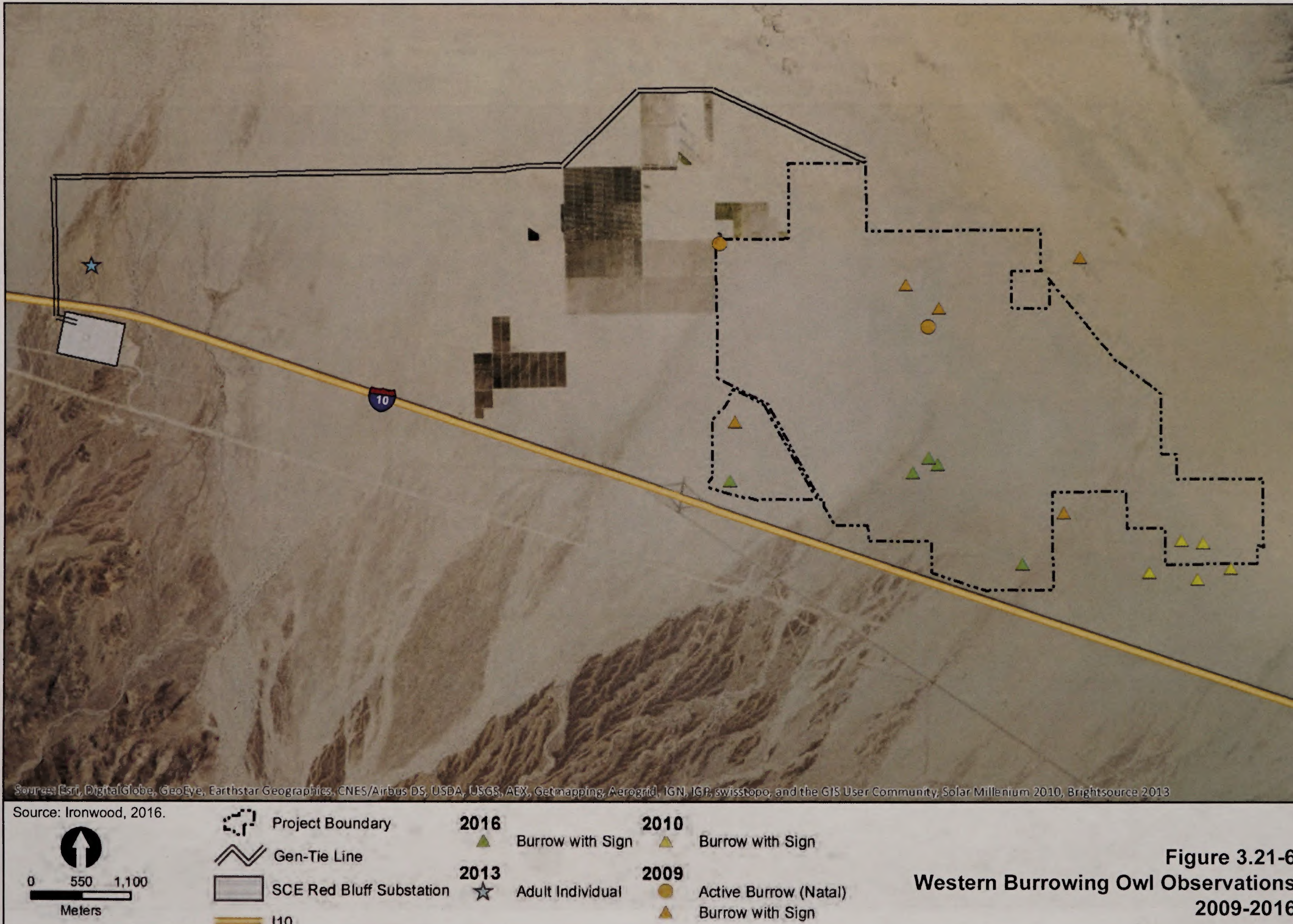


Figure 3.21-5

Mojave Fringe-Toed Lizard Observations within Project Site 2009-2016



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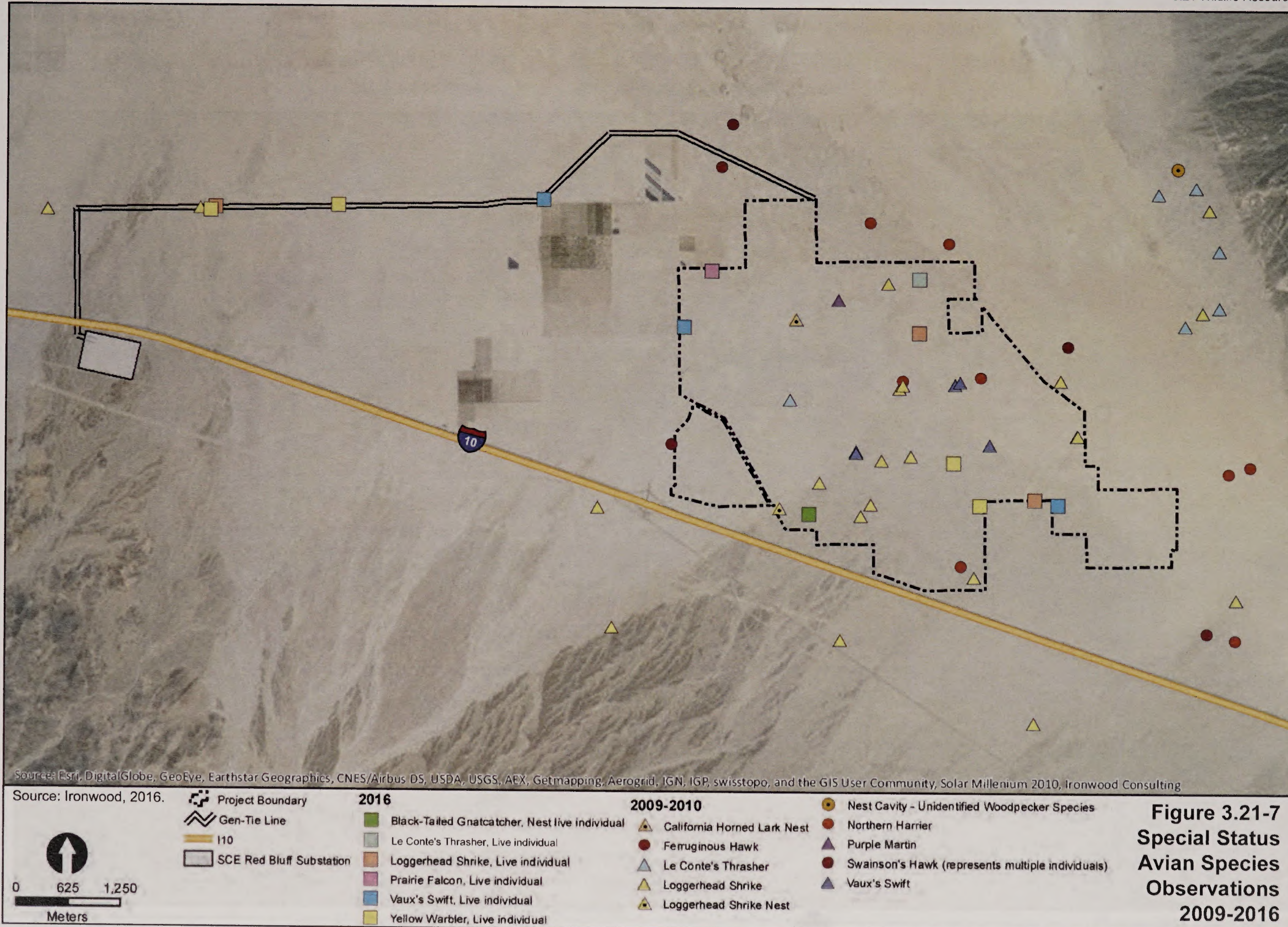

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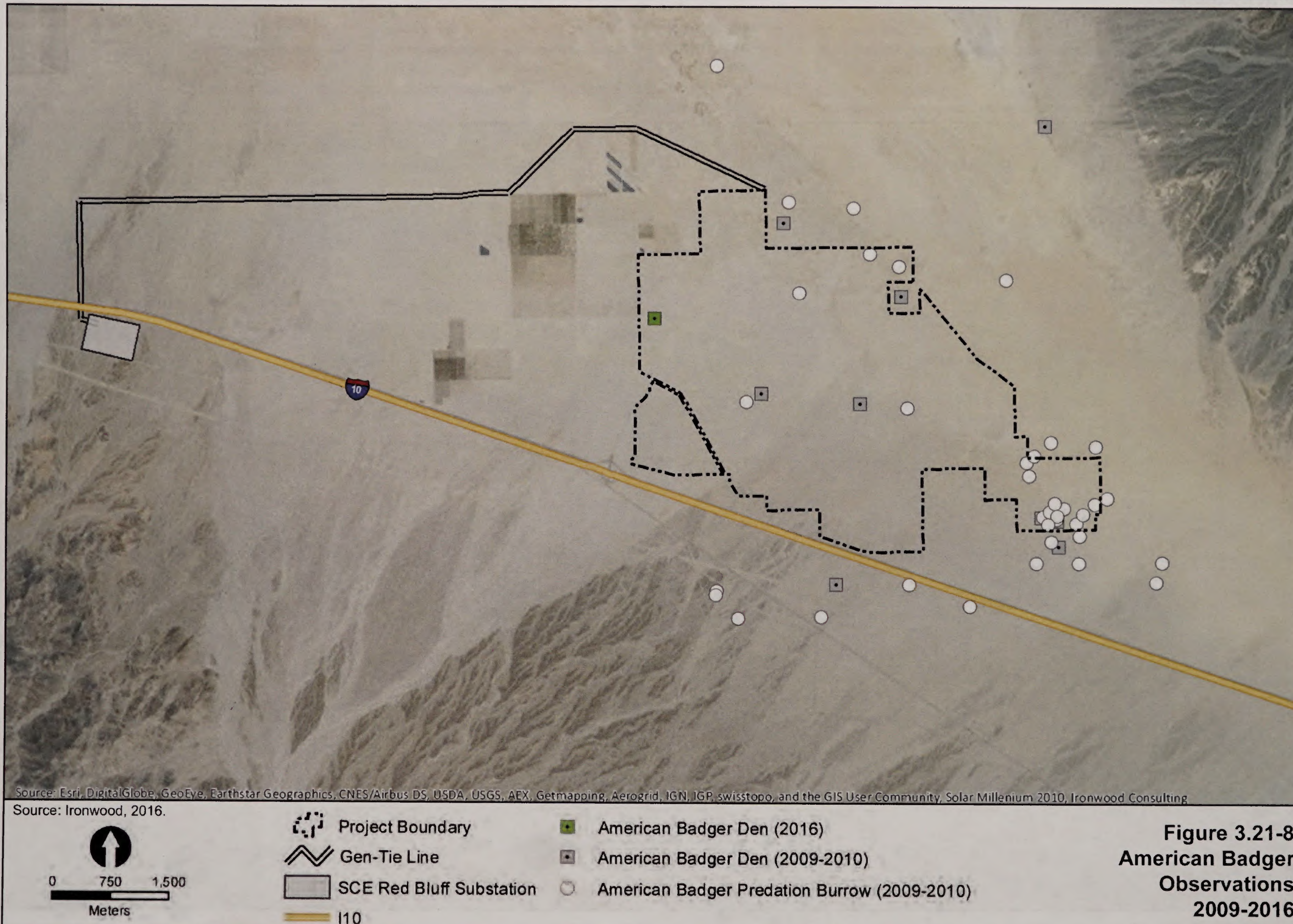
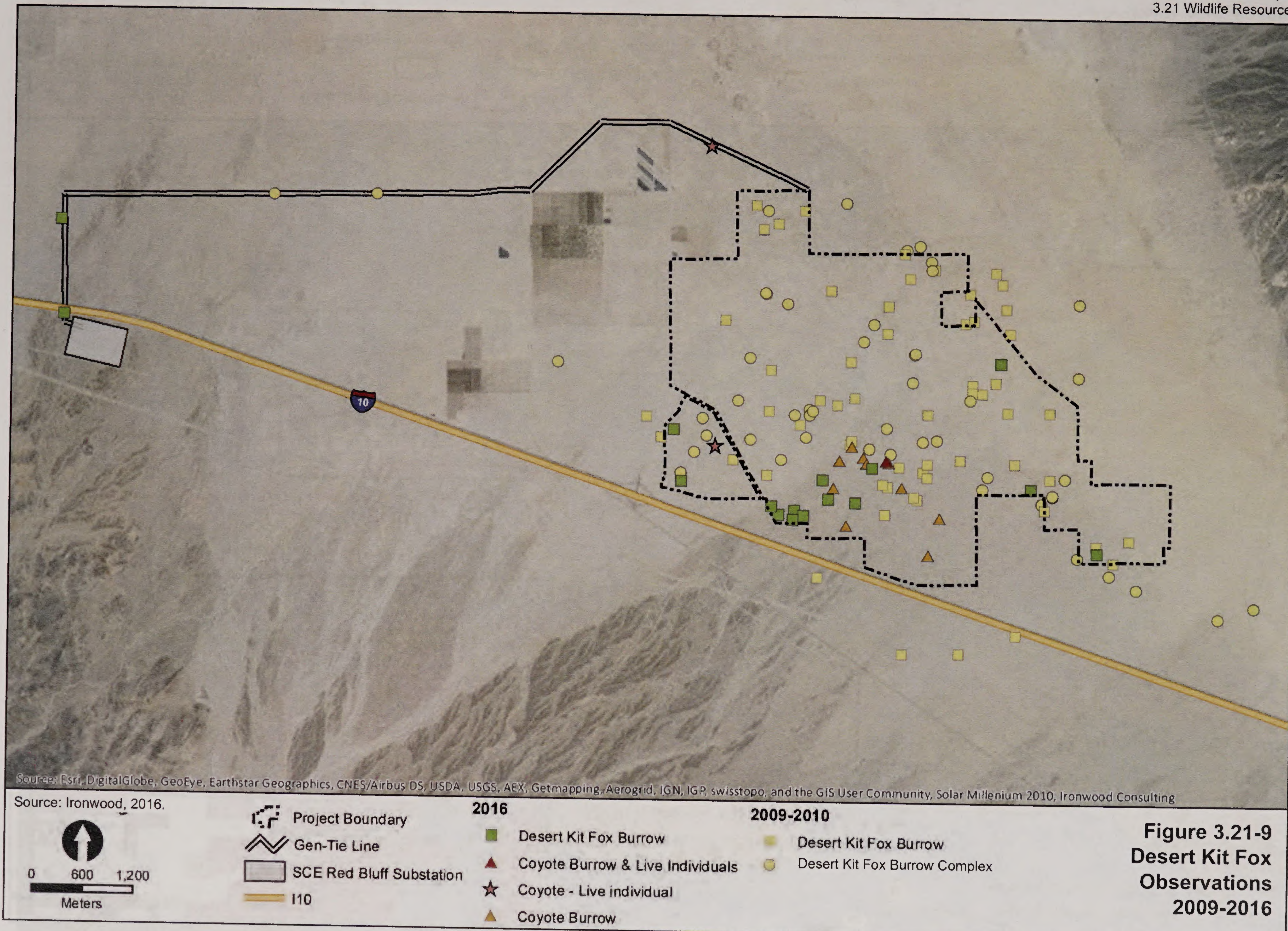


Figure 3.21-8 American Badger Observations 2009-2016



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Desert Kit Fox Observations 2009-2016

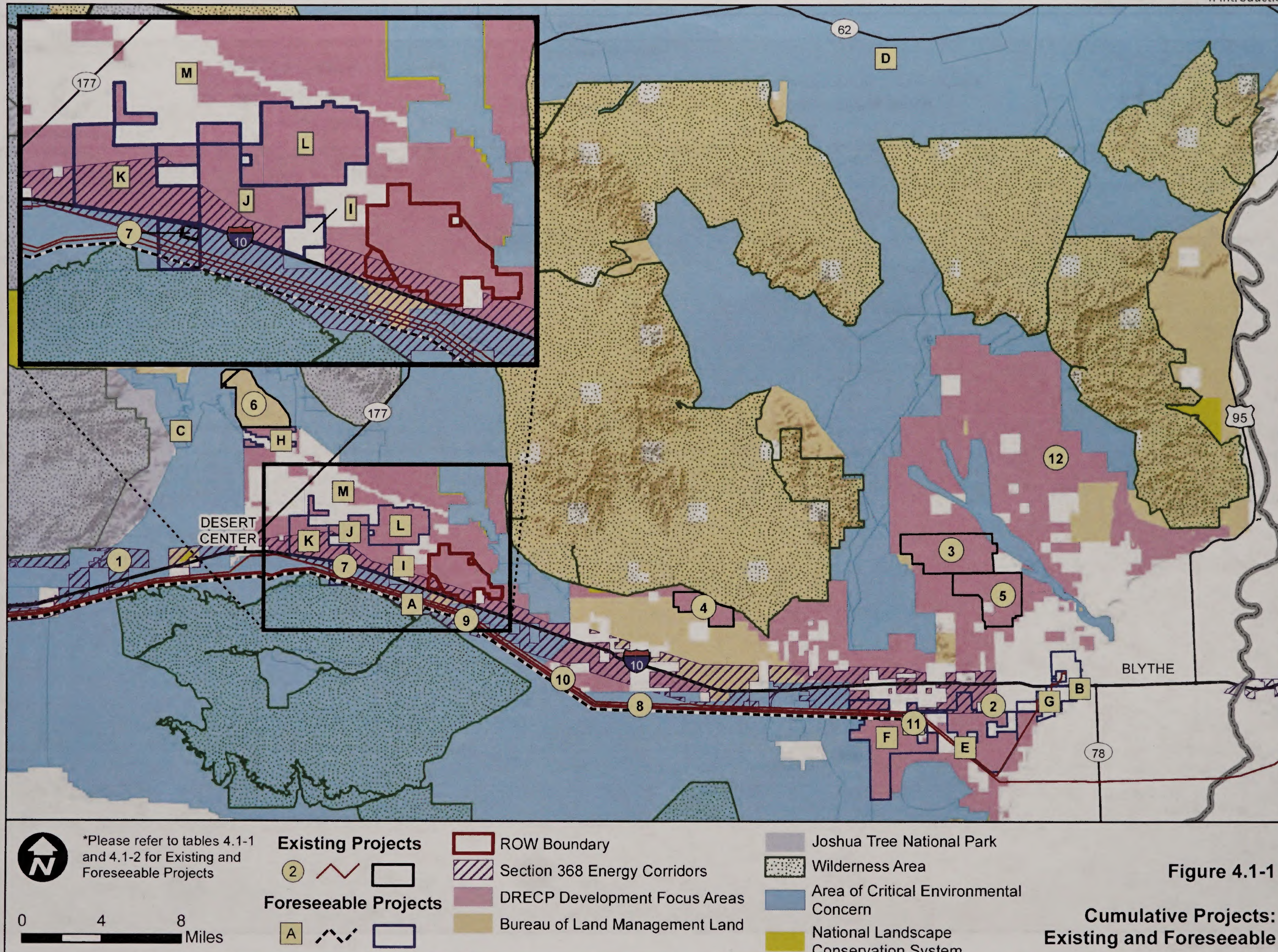


Figure 4.1-1

Cumulative Projects: Existing and Foreseeable

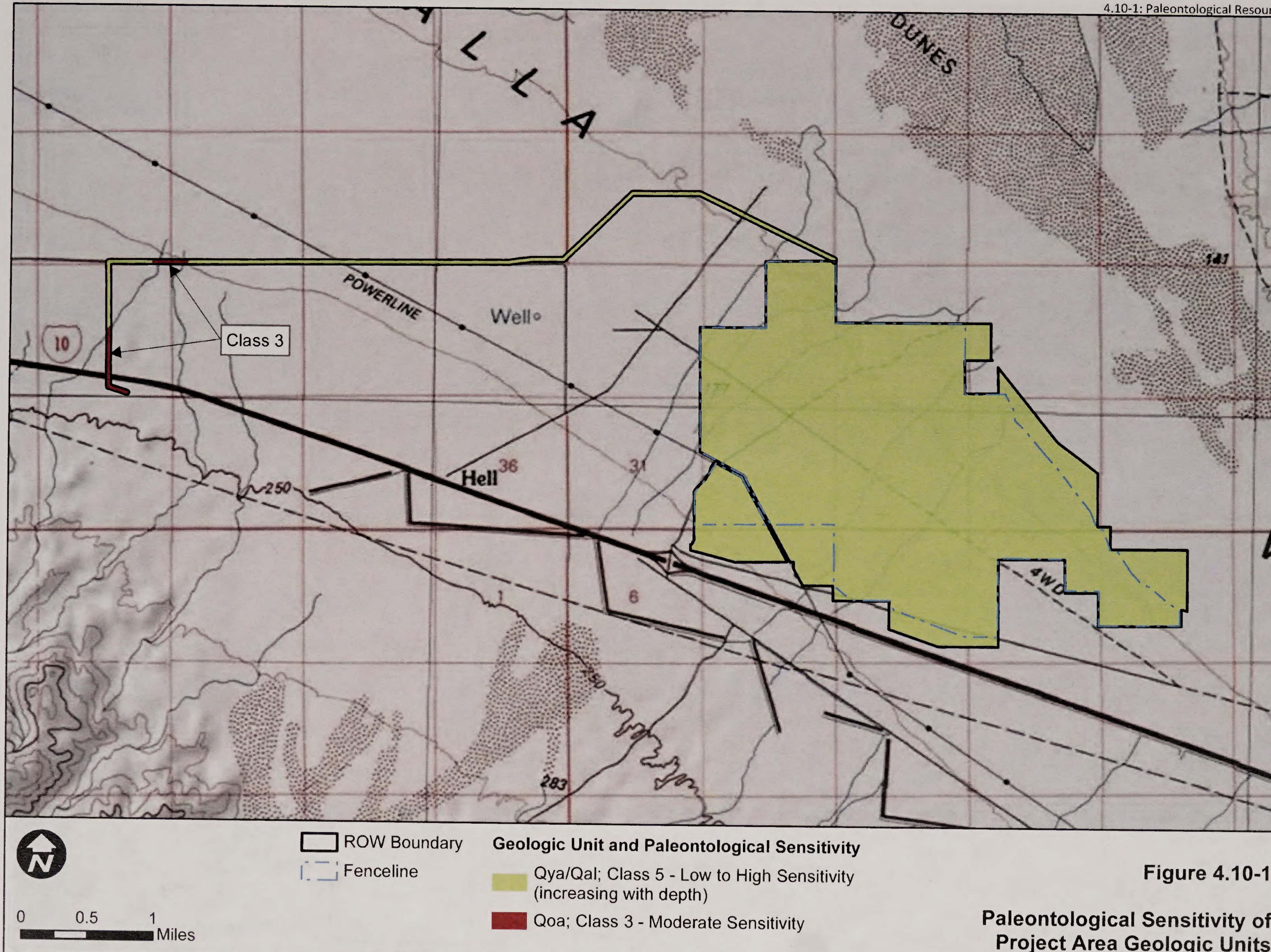
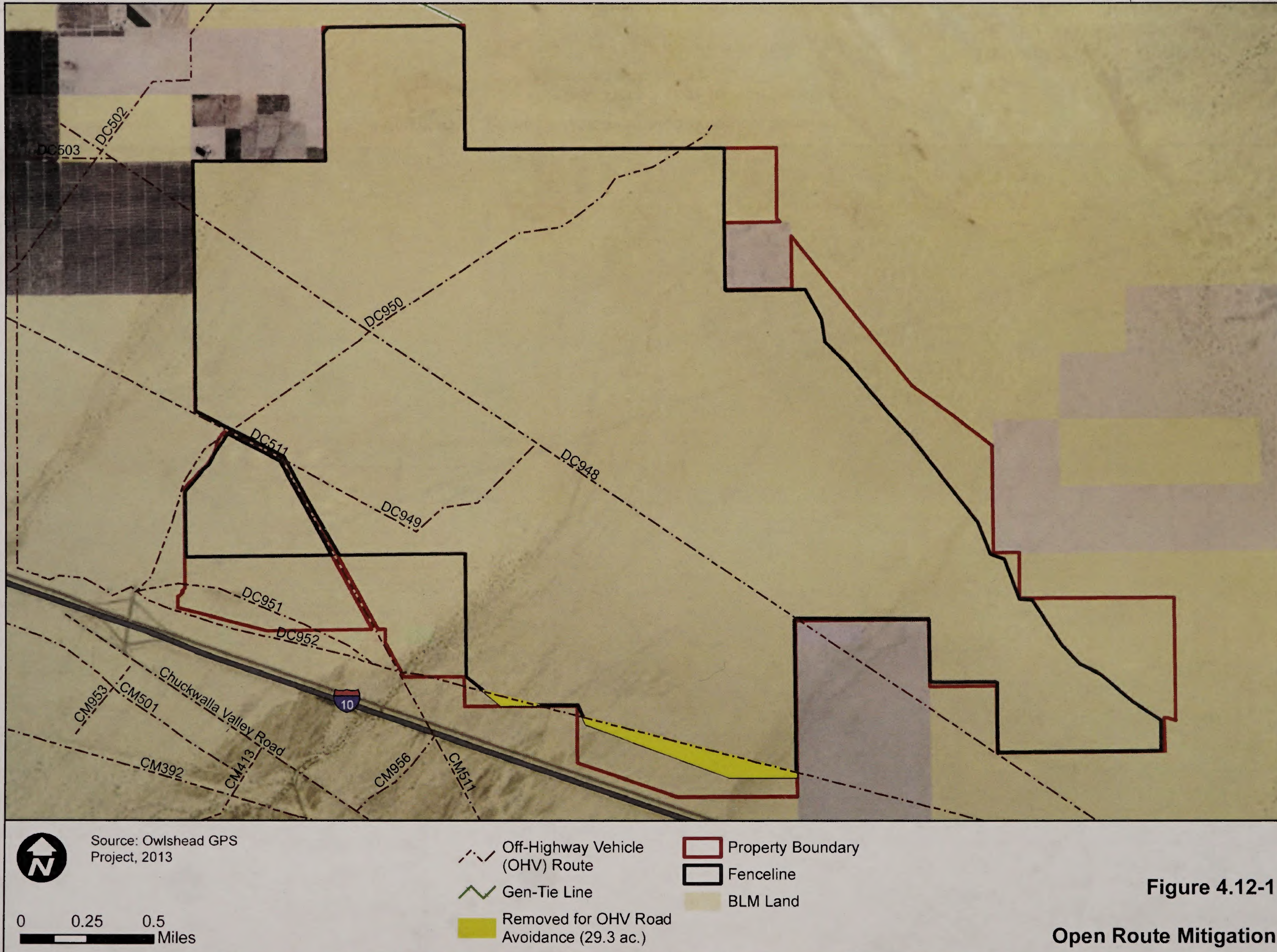


Figure 4.10-1

Paleontological Sensitivity of Project Area Geologic Units



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Open Route Mitigation

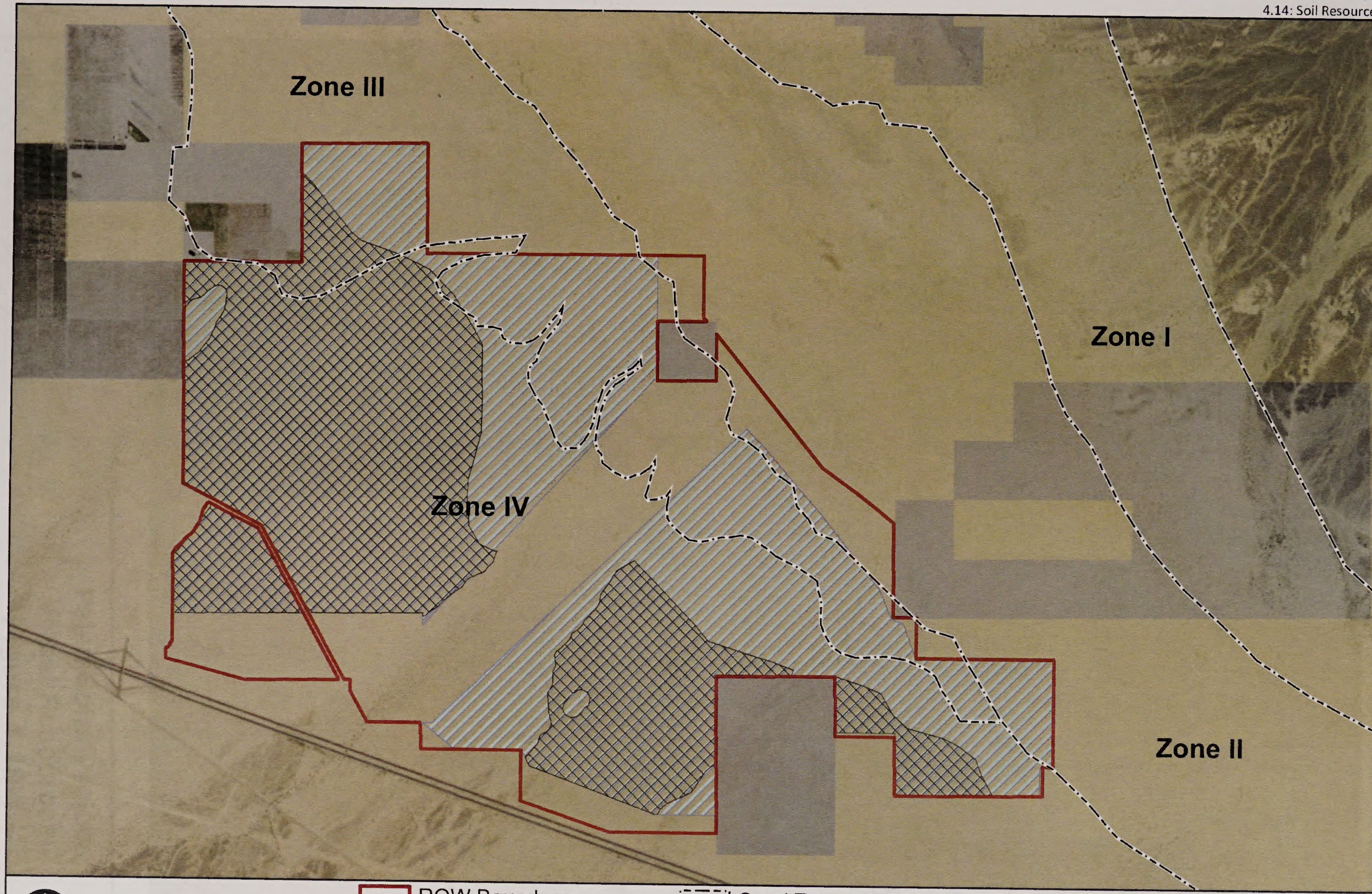
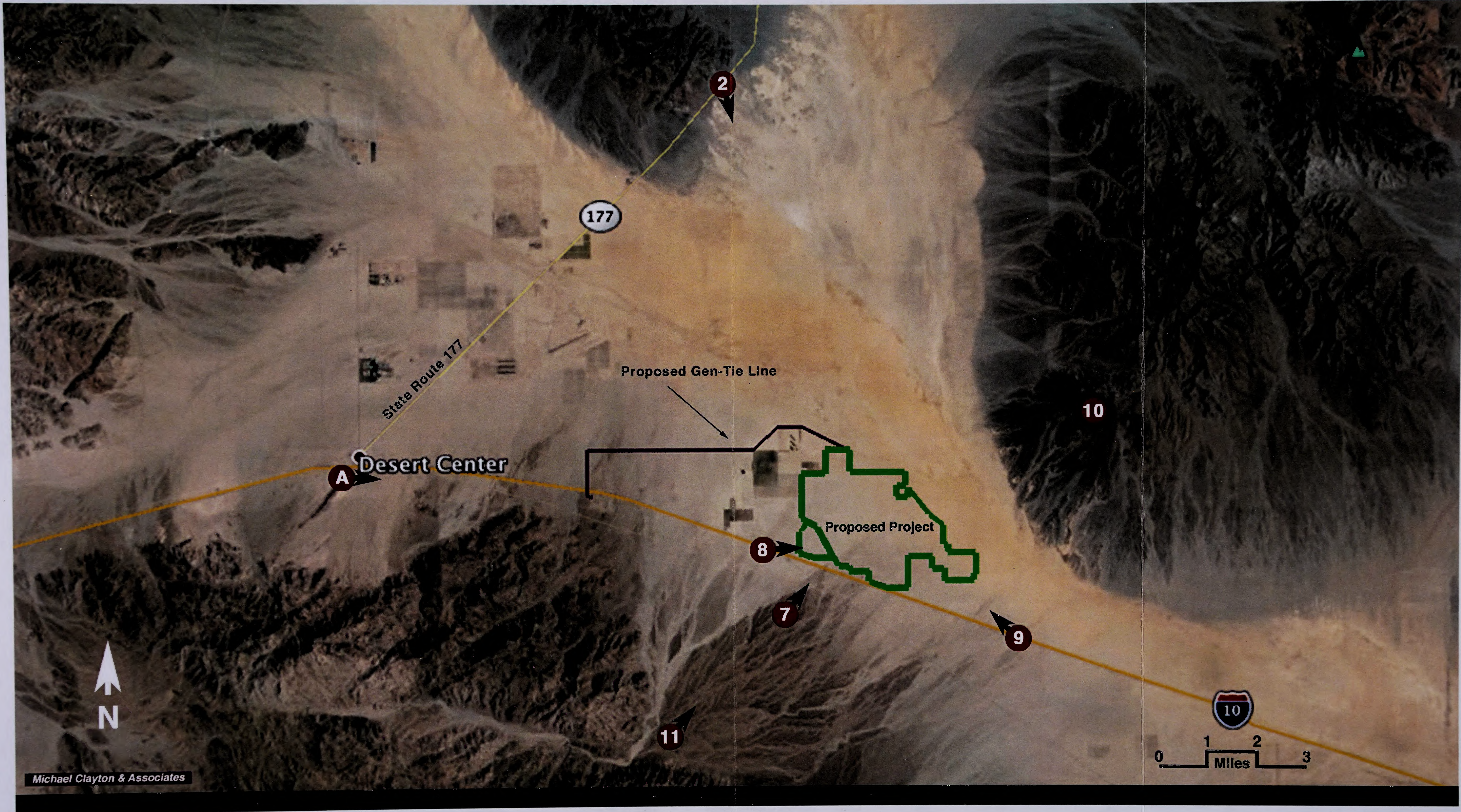


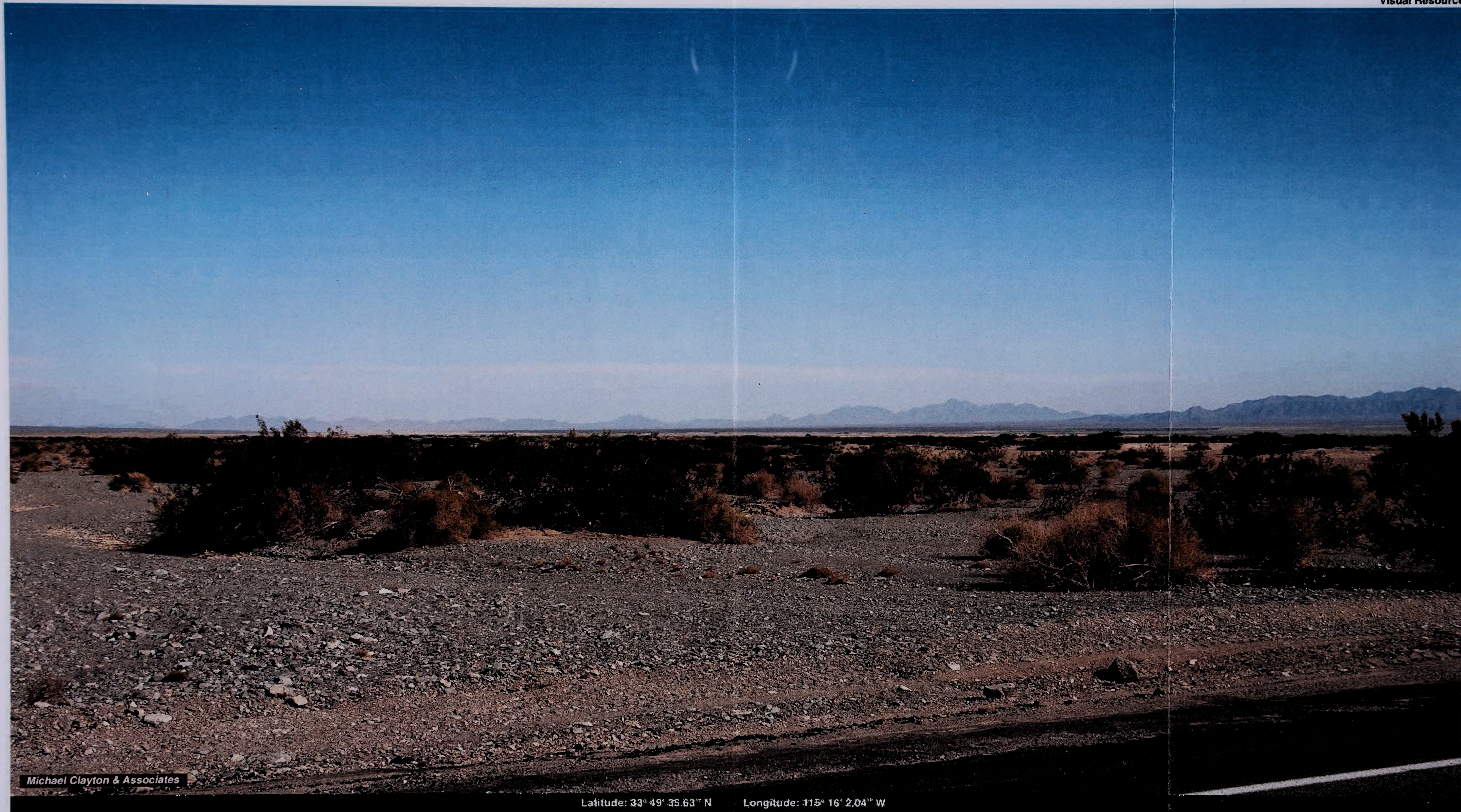
Figure 4.14-1

Sand Transport Zone and Alternatives

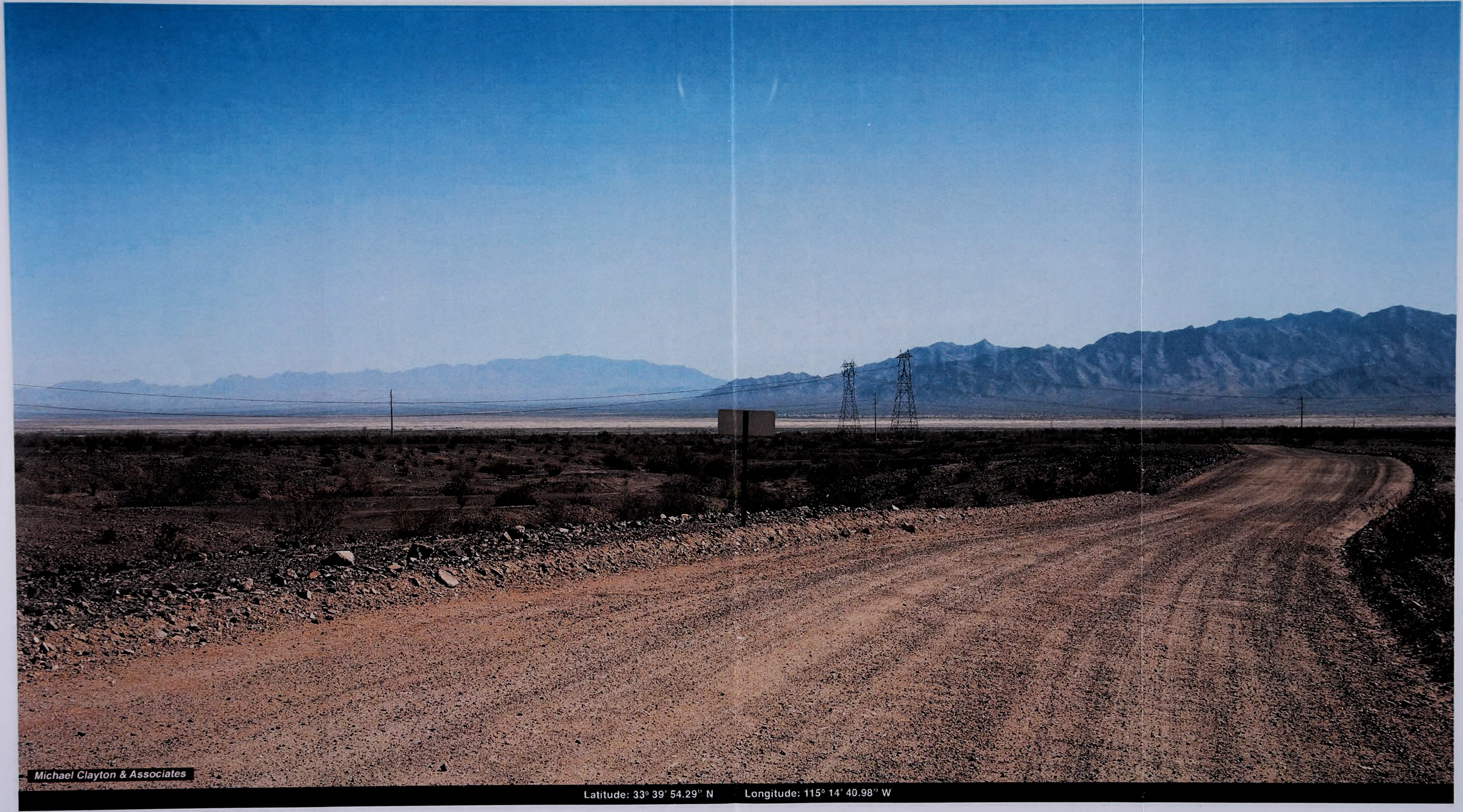


LEGEND	KOP Map	Palen Solar Project Visual Resources Figure 4.18-1
Proposed Project Boundary Proposed Gen-Tie Line 2 Key Observation Point (KOP)		

This image presents the **Existing View** to the south-southeast from **KOP 2** on State Route 177 in Palen Valley, approximately 8.0 miles north of the proposed Project site in Chuckwalla Valley. This view overlooks much of the central portions of the Palen and Chuckwalla Valleys, which are topographically flat and sparsely vegetated. The Chuckwalla, Little Chuckwalla, and Mule mountains beyond provide distant features of visual interest.	KOP 2 SR 177 Existing View	Palen Solar Project Visual Resources **Figure 4.18-2A**



This image presents a **Visual Simulation** of the proposed Project from **KOP 2** on State Route 177 in Palen Valley, approximately 8.0 miles north of the proposed Project site in the central Chuckwalla Valley adjacent to and north of I-10. From this distant vantage point, viewing angle, and afternoon viewing time, the proposed facility would appear as a medium-gray streak along the distant valley floor near the base of the central mountain ranges. The gen-tie line would not be noticeable at this viewing distance.	**KOP 2** **SR 177** **Visual Simulation**	**Palen Solar Project** **Visual Resources** **Figure 4.18-2B**



This image presents the **Existing View** to the north-northeast from **KOP 7** on Corn Springs Road near the northern boundary of the Chuckwalla Mountains Wilderness, south of I-10 and approximately 1.5 miles south of the southwest corner of the proposed Project site. This view captures a central portion of Chuckwalla Valley and Palen Dry Lake, backdropped by the Palen Mountains (right center) and Coxcomb Mountains (left center). An existing utility corridor is prominently visible in the foreground of the view.	**KOP 7** **Corn Springs Road** **Existing View**	**Palen Solar Project** **Visual Resources** **Figure 4.18-3A**

This image presents a **Visual Simulation** of the proposed Project from **KOP 7** on Corn Springs Road near the northern boundary of the Chuckwalla Mountains Wilderness, south of I-10 and approximately 1.5 miles south of the southwest corner of the proposed Project site. From this vantage point and afternoon viewing time, the proposed tracking arrays would be facing west and would appear as a narrow dark streak along the valley floor. The eastern-most portion of the gen-tie line would also be slightly visible.	**KOP 7** **Corn Springs Road** **Visual Simulation**	**Palen Solar Project** **Visual Resources** **Figure 4.18-3B**

This image presents the **Existing View** to the east from **KOP 8** on eastbound I-10, approximately 0.5 mile west of the Corn Springs Road overpass. This view captures a portion of the central Chuckwalla Valley north of I-10 and south of the Palen Mountains. While much of the valley appears undeveloped, an existing solar project to the east is visible as a horizontal, light-gray feature along the valley floor (at the base of the mountains) at the far right of the image, backdropped by the more distant McCoy Mountains.	**KOP 8** **Eastbound I-10** **Existing View**	**Palen Solar Project** **Visual Resources** **Figure 4.18-4A**

This image presents a **Visual Simulation** of the proposed Project from **KOP 8** on eastbound I-10, west of the Corn Springs Road overpass. This view encompasses portions of the proposed Project at viewing distances from KOP 8 ranging from approximately 0.75 mile to approximately 1.8 miles. The tracking panels are illustrated in a westward (afternoon) tilt and are facing in the general direction of KOP 8.	**KOP 8** **Eastbound I-10** **Visual Simulation**	**Palen Solar Project** **Visual Resources** **Figure 4.18-4B**

This image presents the **Existing View** to the northwest from **KOP 9** on westbound I-10, approximately 1.6 miles southeast of the southeast corner of the proposed Project site and approximately 10.4 miles west of the Palen Dunes Road overpass. This view encompasses a central portion of Chuckwalla Valley with the Eagle Mountains (center left) and Coxcomb Mountains (center right) providing background features of visual interest. From this vantage point, there are no discernible built facilities.

KOP 9
Westbound I-10
Existing View

Palen Solar Project
Visual Resources
Figure 4.18-5A

This image presents a **Visual Simulation** of the proposed Project from **KOP 9** on westbound I-10, approximately 1.6 miles southeast of the southeast corner of the proposed Project site. This view encompasses portions of the Project at viewing distances from KOP 9 ranging from approximately 1.6 miles to 3.6 miles. The tracking panels are illustrated in an eastward (morning) tilt and are partially screened by intervening vegetation, particularly vegetation in proximity to Sutro Ditch.	**KOP 9** **Westbound I-10** **Visual Simulation**	**Palen Solar Project** **Visual Resources** **Figure 4.18-5B**

This image presents the **Existing View** to the southwest from **KOP 10** in the Palen McCoy Wilderness, approximately 4.3 miles northeast of the proposed Project site. This elevated view overlooks much of the central Chuckwalla Valley, backdropped by the Chuckwalla Mountains. Due to access limitations, an existing view image could not be obtained, so an existing view image from the PSEGS Draft SEIS was used instead.	**KOP 10** **Palen McCoy Wilderness** **Existing View**	**Palen Solar Project** **Visual Resources** **Figure 4.18-6A**

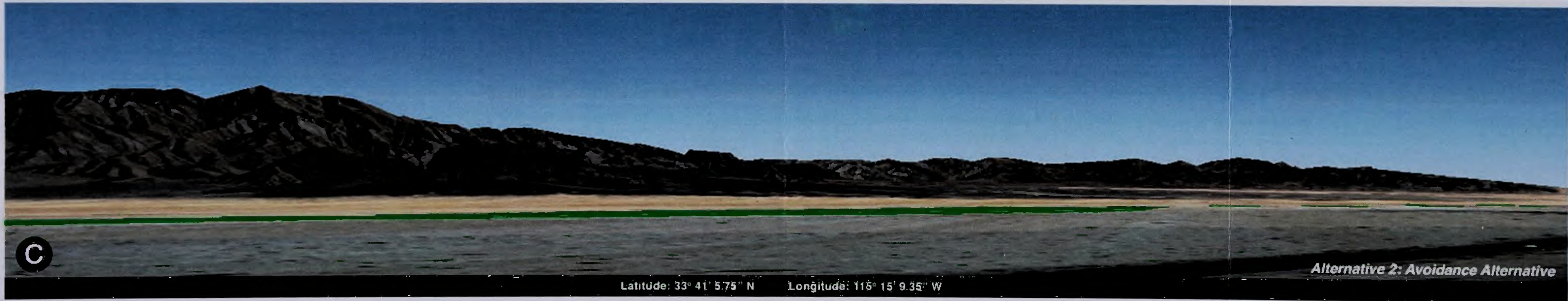
This image presents a **Visual Simulation** of the proposed Project from **KOP 10** in the Palen McCoy Wilderness, approximately 4.3 miles northeast of the proposed Project site. From this elevated vantage point and morning viewing time, the proposed tracking arrays would face east (in the general direction of the viewer at KOP 10), appearing as a darker area against the lighter soils of the Chuckwalla Valley floor. The gen-tie line would be only faintly visible at this viewing distance due to blending with the valley floor.	**KOP 10** **Palen McCoy Wilderness** **Visual Simulation**	**Palen Solar Project** **Visual Resources** **Figure 4.18-6B**

This image presents the **Existing View** to the northeast from **KOP 11** on Corn Springs Road within the Chuckwalla Mountains Wilderness (either side of road), approximately 4.8 miles southwest of the southwest corner of the proposed Project site. This view captures a central portion of Chuckwalla Valley, backdropped by the Palen Mountains. Palen Dry Lake is visible as a light-colored streak in the left center of the image. Two existing transmission lines are also faintly visible in the center of the image.	**KOP 11** **Chuckwalla Mtns. Wilderness** **Existing View**	**Palen Solar Project** **Visual Resources** **Figure 4.18-7A**

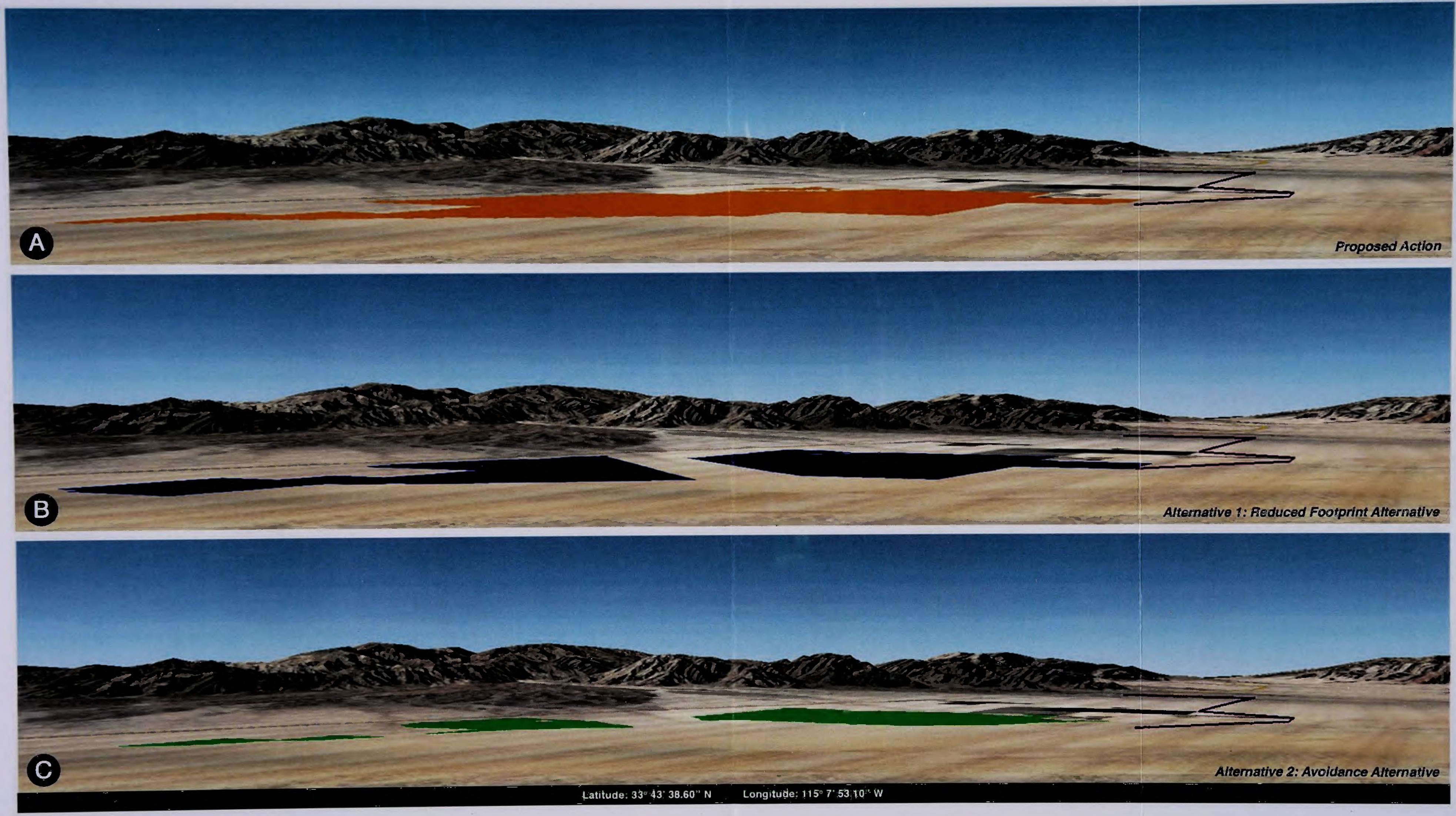
This image presents a **Visual Simulation** to the northeast from **KOP 11** on Corn Springs Road within the Chuckwalla Mountains Wilderness (either side of the road), approximately 4.8 miles southwest of the southwest corner of the proposed Project site. From this distant vantage point and afternoon viewing time, the proposed tracking arrays would be facing west and would appear as a narrow, dark streak along the distant valley floor. Only a short portion of the gen-tie line would be faintly visible (far left of image).

KOP 11
Chuckwalla Mtns. Wilderness
Visual Simulation

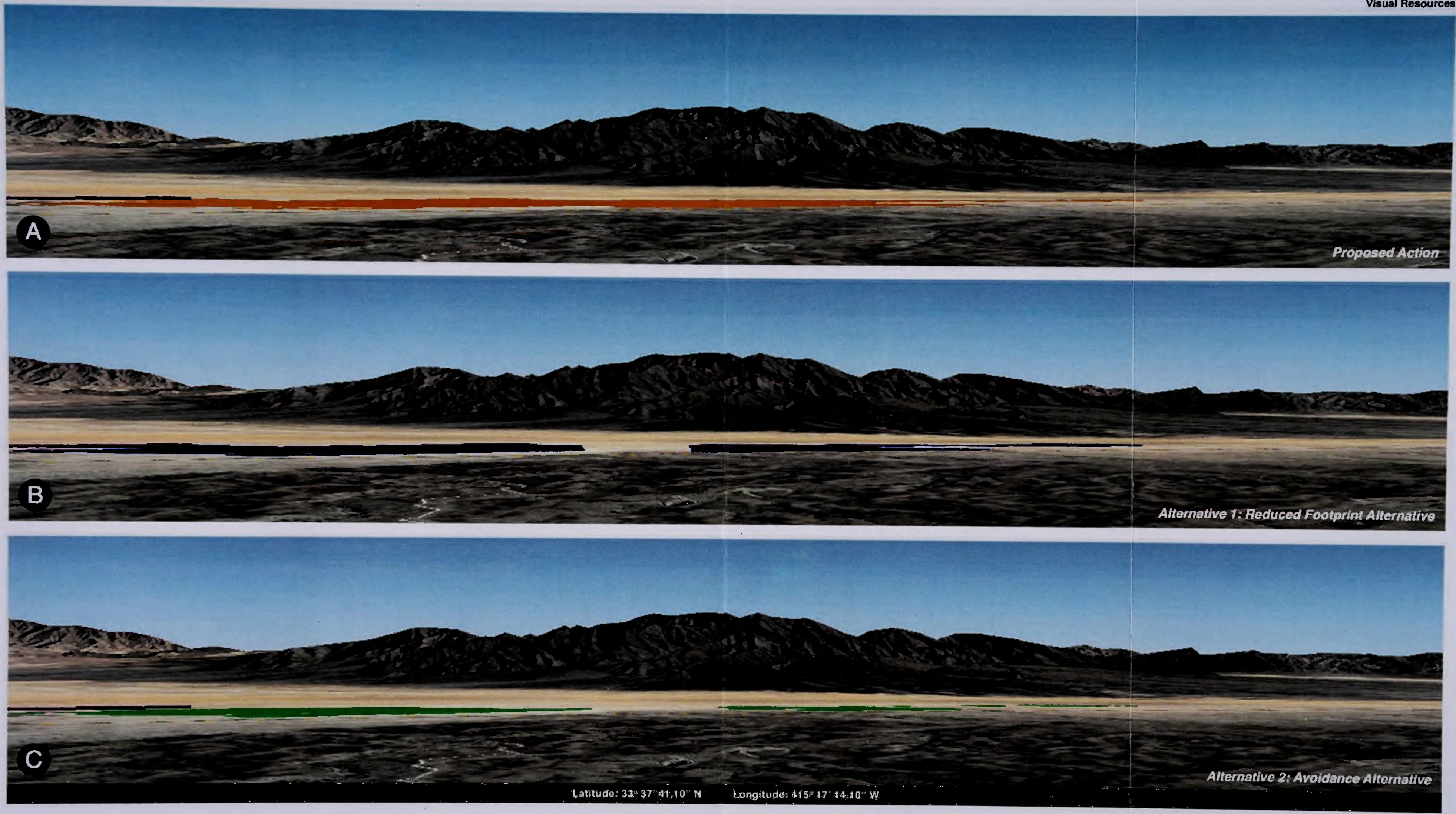
Palen Solar Project
Visual Resources
Figure 4.18-7B



This figure presents a comparison of three alternatives from the vantage point of **KOP 8,** on **Eastbound I-10,** west of the Corn Springs Road overpass. The figures above present Google Earth perspectives of **(A)** the Proposed Action, **(B)** the Reduced Footprint Alternative, and **(C)** the Avoidance Alternative. The images are not intended to simulate the alternatives. They are presented to illustrate the relative geographic extents of the three alternatives as viewed from KOP 8.	**KOP 8** **Eastbound I-10** **Alternatives Comparison**	**Palen Solar Project** **Visual Resources** **Figure 4.18-8**



This figure presents a comparison of three alternatives from the vantage point of **KOP 10**, in the **Palen McCoy Wilderness**. The figures above present Google Earth perspectives of **(A)** the Proposed Action, **(B)** the Reduced Footprint Alternative, and **(C)** the Avoidance Alternative. The images are not intended to simulate the alternatives. They are presented to illustrate the geographic extents of the three alternatives in order to better understand their relative impact differences as viewed from KOP 10.	**KOP 10** **Palen McCoy Wilderness** **Alternatives Comparison**	**Palen Solar Project** **Visual Resources** **Figure 4.18-9**



This figure presents a comparison of three alternatives from the vantage point of **KOP 11,** on **Corn Springs Road,** within the Chuckwalla Mountains Wilderness. The figures above present Google Earth perspectives of **(A)** the Proposed Action, **(B)** the Reduced Footprint Alternative, and **(C)** the Avoidance Alternative. The images are not intended to simulate the alternatives. They are presented to illustrate the relative geographic extents of the three alternatives as viewed from KOP 11.	**KOP 11** **Chuckwalla Mtns. Wilderness** **Alternatives Comparison**	**Palen Solar Project** **Visual Resources** **Figure 4.18-10**

Appendix B-1

Biological Resources Technical Report

BIOLOGICAL RESOURCES TECHNICAL REPORT
PALEN SOLAR PV PROJECT
BLM CASE FILE NUMBER CACA-48810
RIVERSIDE COUNTY, CALIFORNIA

Prepared for
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April 12, 2017

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List of Acronyms

agl	above ground level
amsl	above mean sea level
AC	Alternating Current
BRSA	Biological Resources Study Area
BRTR	Biological Resources Technical Report
BBCS	Bird and Bat Conservation Strategy
BUC	Bird Use Count
BBI	Bloom Biological, Inc.
BLM	Bureau of Land Management
CDD	California Desert District
CDFG	California Department of Fish and Game (now Wildlife)
CDFW	California Department of Fish and Wildlife
CDFA	California Department of Food and Agriculture
CDPA	California Desert Protection Act of 1994
CESA	California Endangered Species Act
CEC	California Energy Commission
CEQA	California Environmental Quality Act
Cal-IPC	California Invasive Plant Council
CNPS	California Native Plant Society
CNDDB	California Natural Diversity Database
CRPR	California Rare Plant Rank
CDV	Canine Distemper Virus
CHUs	Critical Habitat Units
DRECP	Desert Renewable Energy Conservation Plan
DWMA	Desert Wildlife Management Area
DC	Direct Current
EA	Environmental Assessment
FESA	Federal Endangered Species Act
FWS	Fish and Wildlife Service
GIS	Geographic Information Systems
GPS	Global Positioning System
IWMP	Integrated Weed Management Plan
I-10	Interstate 10
MCL	Midline Carapace Length
MBTA	Migratory Bird Treaty Act
MFTL	Mojave Fringe-toed Lizard
NEPA	National Environmental Protection Act
NPS	National Park Service
NECO Plan	Northern and Eastern Colorado Desert Coordinated Management Plan

O&M	Operations and Maintenance
POD	Plan of Development
PSEGS	Palen Solar Energy Generating Station
PSPP	Palen Solar Power Project
PV	Photovoltaic
PA/FEIS	Plan Amendment/Final Environmental Impact Statement
PVA	Population Viability Assessment
RTHA	Red-tailed Hawk
RSA	Revised Staff Assessment
RESEZ	Riverside East Solar Energy Zone
TCAs	Tortoise Conservation Areas
USFWS	US Fish and Wildlife Service
WHMA	Wildlife Habitat Management Area
WRI	Wildlife Research Institute

1 INTRODUCTION

1.1 Background

In 2007, Chevron Energy Solutions and Solar Millennium proposed the Palen Solar Power Project (PSPP) in unincorporated Riverside County, California, through an application for a right-of-way (ROW) grant from the Bureau of Land Management (BLM). The PSPP included over 4,300 acres of concentrating solar project (solar parabolic trough technology). In 2011, the California Energy Commission (CEC) prepared a Staff Assessment, the BLM prepared a Final Environmental Impact Statement (FEIS), and the U.S. Fish and Wildlife Service prepared a Biological Opinion for effects to desert tortoise (*Gopherus agassizii*) for the PSPP. In 2012, BrightSource acquired the pending ROW grant application and proposed the Palen Solar Electric Generating System (PSEGS), which included a change in technology that consisted of two 750-foot towers, associated heliostat arrays, and modifications to linear project components (including the generation interconnection line (gen-tie) to accommodate the relocation of the Red Bluff Substation). In 2013, BrightSource and its joint venture, Abengoa Solar, Inc., submitted updated documentation to the CEC and BLM. The BLM prepared a Draft Supplemental EIS for the PSEGS project in July 2013. In 2015, EDF Renewable Energy (EDF RE) acquired the pending ROW grant application. Palen Solar III, LLC (Applicant), a fully owned subsidiary of EDF RE (and Palen Solar Holdings, LLC), has applied to amend the ROW grant application (Case File Number CACA-48810) from the BLM to construct, operate, and decommission a solar photovoltaic (PV) energy generating facility. The solar facility and associated gen-tie are collectively referred to in this report as the Palen Solar PV Project (Project), which is proposed to be sited within the previously analyzed PSPP and PSEGS footprints.

1.2 Purpose

This Biological Resources Technical Report (BRTR) provides a description of methods and results of biological resource surveys and investigations conducted between 2009 and 2016 for the PSPP, PSEGS, and Palen Solar PV Project.

The primary purpose of this report is to provide biological information that will be used as the foundation for impact assessments pursuant to the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). The focus of this report is to consolidate and describe relevant biological resource data. A full assessment of impacts to biological resources can be found in the NEPA/CEQA environmental document. The discussion included herein may also be used to support formal consultation between Bureau of Land Management (BLM) and U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Federal Endangered Species Act

(FESA), and any necessary incidental take authorization from the California Department of Fish and Wildlife (CDFW) with respect to the California Endangered Species Act (CESA).

1.3 Site Location

The Project site is located entirely on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM), located in unincorporated Riverside County, California. The site is located approximately ten miles east of the unincorporated community of Desert Center along Interstate 10 (I-10), halfway between the cities of Indio and Blythe (Figures 1 and 2). The Project site can be found on the Sidewinder Well 7.5-Minute U.S. Geological Survey topographic quadrangle. The Project site is located within the Riverside East Solar Energy Zone (SEZ) of BLM's Western Solar Plan, as designated in the Solar Programmatic Environmental Impact Statement and approved by a Record of Decision signed by the BLM on October 12, 2012.

The Project site is located within two wildlife habitat management areas (WHMA) designated in the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO): Palen-Ford WHMA and Desert Wildlife Management Area (DWMA) Connectivity WHMA. Management emphasis for the Palen-Ford WHMA is on the dunes and playas within the Palen-Ford dune system. Management emphasis for the DWMA Connectivity WHMA is on the geographic connectivity for the desert tortoise between the Chuckwalla DWMA and the wilderness area north of I-10. The Palen-McCoy Wilderness is 3 miles to the northeast, Chuckwalla Mountains Wilderness is 1.5 miles to the south, Little Chuckwalla Mountains Wilderness is 16 miles to the southeast, and the Joshua Tree Wilderness is 8.5 miles northwest of the Project site. Approximately 200 acres of the Chuckwalla desert tortoise critical habitat unit (CHU) overlaps the Project site. The majority of the CHU (over 1,023,000 acres) is located south and west of the Project site.

The site is located in the Sonoran Desert ecoregion setting, Chuckwalla Valley ecoregion subsection, of the Desert Renewable Energy Conservation Plan (DRECP). The DRECP includes areas managed by the BLM as the first implementation step. These lands were addressed in the Proposed Land Use Plan Amendment (LUPA) and Final Environmental Impact Statement (FEIS) (BLM 2015). The preferred alternative proposed in the LUPA/FEIS includes the Project site as a Development Focus Area (DFA). The preferred alternative also includes an expansion of Areas of Critical Environmental Concern (ACEC) within the proximity of the Project site including approximately 20,000 acres within the Chuckwalla DWMA, approximately 320,000 acres associated with desert tortoise linkage between the Chuckwalla and Chemehuevi DWMAs, approximately 3,600 acres associated with Palen Dry Lake, and approximately 41,000 acres associated with the Palen-Ford Playa Dunes.

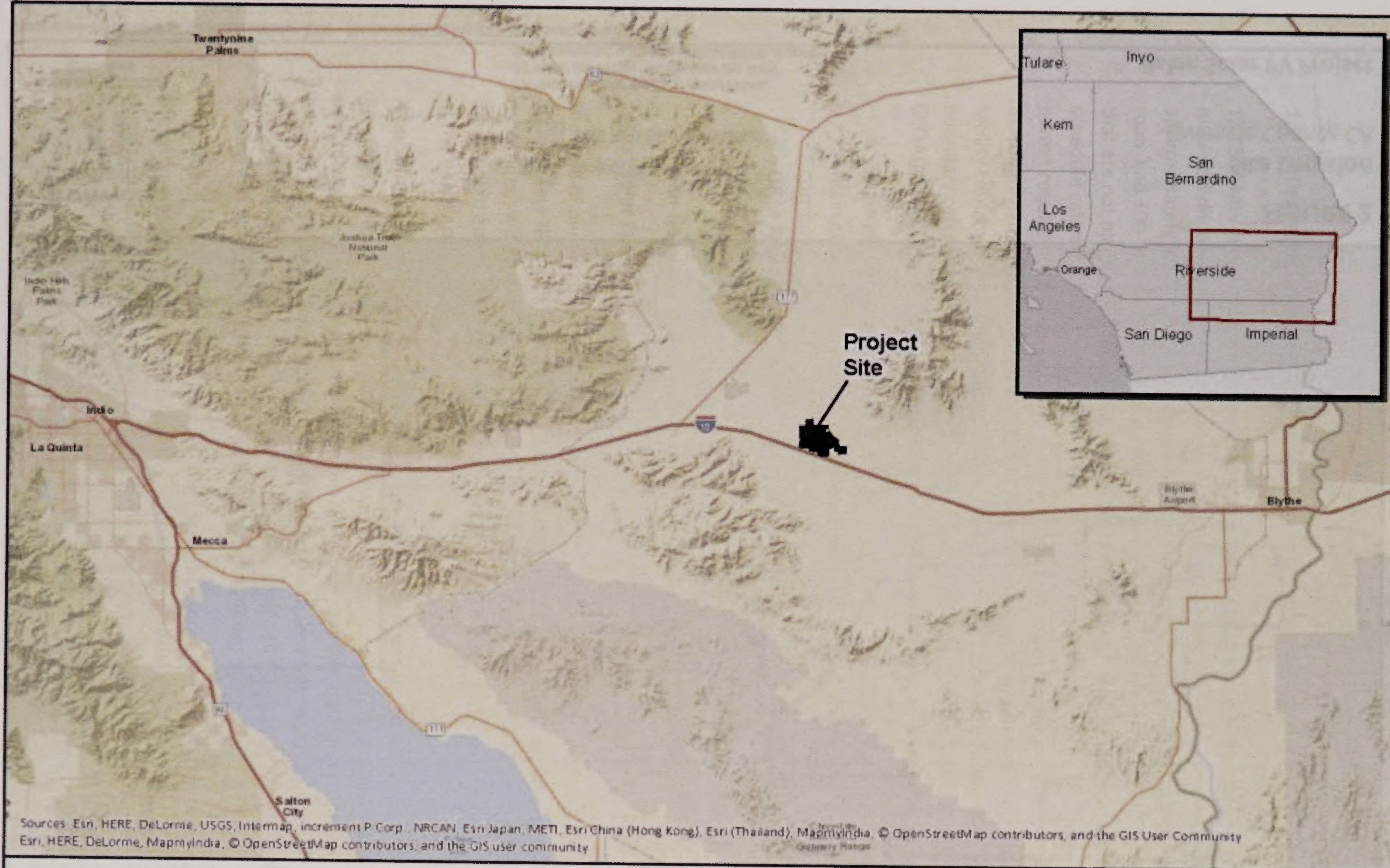

FIGURE 1

Regional Location
Riverside County, CA

Palen Solar PV Project

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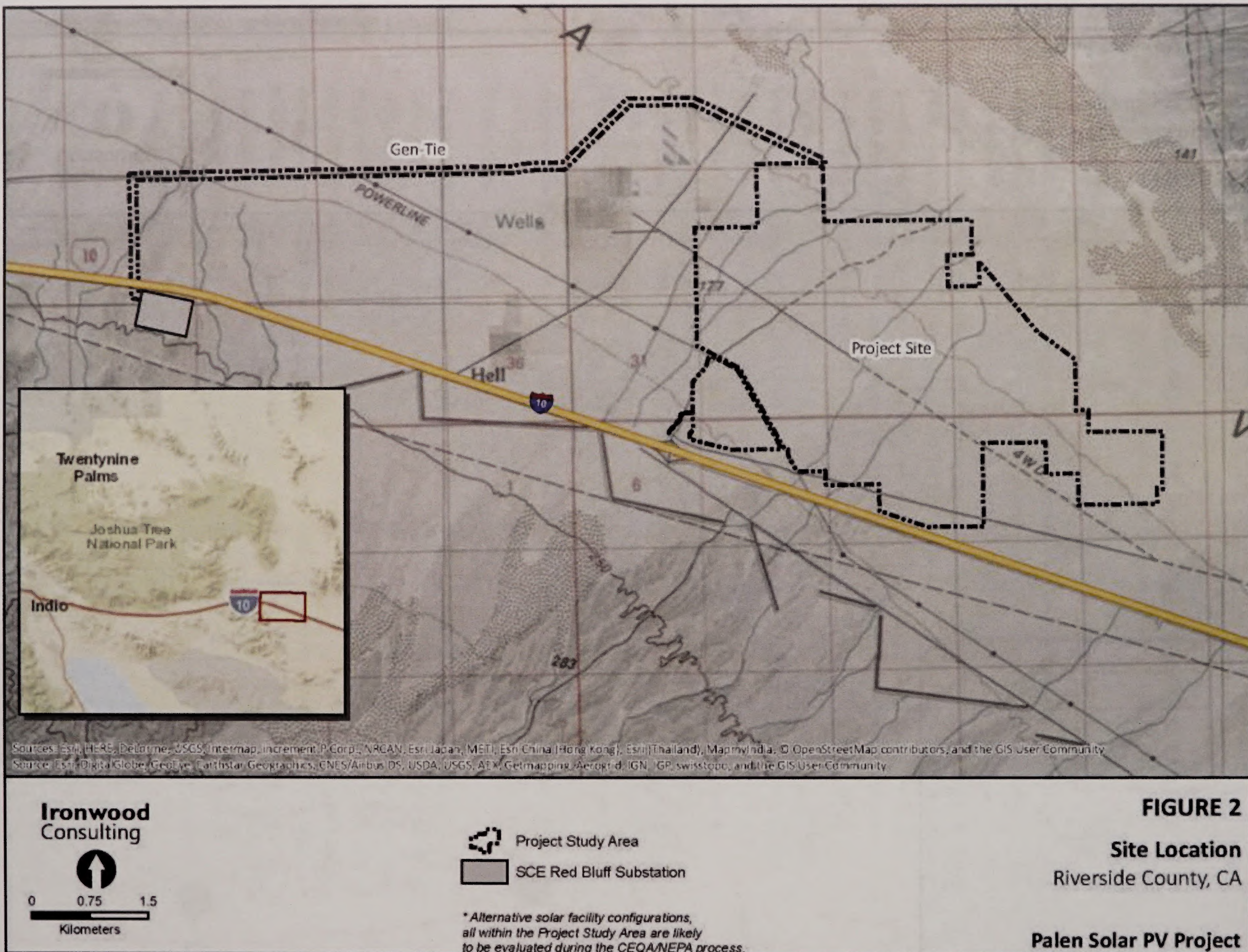

FIGURE 2

Site Location

Riverside County, CA

Palen Solar PV Project

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1.4 Project Summary

The 500 MW (alternating current [AC]) Project would entail a single-axis tracking system with mounted photovoltaic (PV) technology. For the purpose of this report, Ironwood evaluated an approximately 4,200-acre study area, which included the proposed solar facility, main access road, and 300-foot wide, 7-mile long gen-tie line (Figure 2) as well as approximately 840 acres that are not planned for project use. The project disturbance area, equipment used, and schedule estimates may be reduced and/or modified consistent with the final engineering and permit requirements. As part of the Supplemental EIS/EIR, an evaluation of alternatives will be thoroughly analyzed. It is anticipated that BLM will propose and evaluate alternative solar facility configurations, technologies and or other land uses contained within the study area boundary referenced in this report. Alternatives examined will be evaluated during the CEQA/NEPA process. The Project would consist of several main components:

- Main project access road;
- Main generation area—PV arrays, switchyard, inverters, overhead lines, and access corridors;
- O&M Facility – either on or off site;
- On-site electrical substation and switch gear;
- Site security, fencing, and lighting; and
- Gen-tie Line with access road.

1.4.1 Solar Facility

The field of panels consists of repeating blocks of up to 2.50 MW (alternating current [AC]). The approximate dimensions of an array block consisting of 8,046 panels, separated into four quadrants. Within each quadrant, there would be 25 rows comprised of 27-panel strings. Each block would employ two inverters of up to 1.25 MW, set along the access roads, in the middle of the panel array area.

A horizontal single-axis balanced-mass tracker with independently-driven rows is proposed to be used for the PV modules. Tracking systems have a motor that rotates the PV modules from east to west during the day to track the sun across the sky. The tracking system would utilize a wireless communication system so that no communication wiring would be needed. Engineering design of the tracking system would be designed in accordance with code for wind loading and would be constructed of galvanized and stainless steel.

The panel field would be laid out by installing vertical H-pile galvanized steel beams directly into the ground by means of a small pile-driver. A preliminary walk-through by civil engineers suggests that this foundation would be sufficient to meet geotechnical requirements for wind

stability. Site-specific soil tests would be required to validate the preliminary engineering. If tests conclude that further foundations are required, then the vertical H-pile galvanized steel beams would be attached to concrete ballasts. No welding would be required for assembly.

Spacing of the rows is driven primarily by engineering and shading constraints, but would also involve some micro-topography compensation.

1.4.2 Onsite Towers, Substation and Transmission Lines

A PV inverter would convert the DC electric input into grid-quality AC electric output. The AC electrical output would be transmitted from the PV inverter to the adjacent transformer. The transformer would step up the voltage of the AC electrical input and then would transmit the power via the PV collection system to the Project substation. The PV collection system connecting the panels to the inverters will be underground and utilize trenches for the electrical cabling, which would be 3 feet deep and from 3 feet to 6.5 feet wide. The substation would be located in the northerly portion of the Project site and would cover an estimated 5 acres. At the on-site substation, the generated electricity would be stepped up to 230 kV and routed via a new gen-tie line to the approved Southern California Edison (SCE) Red Bluff Substation.

Steel monopoles approximately 115 to 135 feet tall would be used for the gen-tie line. Typical spans between poles would be 900 to 1,100 feet. Self-weathering steel would be used for the monopoles, which are intended to blend with the surrounding mountains. The tower foundations for the gen-tie line would require ground disturbance to a depth of 20 to 30 feet. All fiber optic communication lines necessary to support the on-site telecommunication equipment would be located on the same poles used to support the gen-tie line.

1.4.3 Access Roads

The primary point of access to the Project site would be via the I-10 off the Corn Springs Exit along an existing road. Leaving the northern terminus of Corn Springs Road, the project will have an access road of less than a ¼ mile to the main gates. Although the existing road would be used to the extent possible, a new, 24-foot wide unpaved road would be constructed to serve as a primary point of access from the I-10 Corn Springs exit to the Project site. The access road would be constructed from a point just north of the I-10 Corn Springs Road exit, northerly along the existing dirt road for a short distance, then east to the Project site entrance. The new entrance road would enter the site at its western-most extent, near the temporary construction laydown area. Access roads within the Project site would be 24 feet wide and would be cleared, graded and covered with aggregate. Up to a 30-foot wide perimeter road, separating the solar arrays from the perimeter fencing, would be constructed around the entire perimeter of the

Project, on the inside of the fenceline. The roads would be constructed to allow fire and maintenance vehicle access.

1.4.4 Site Security Fencing

Site security would be of the utmost importance due to the high value of the solar panels used and the safety of personnel and the public. At the onset of construction, site access would be controlled for personnel and vehicles. Prior to panel installation, security fencing would be erected around the entire perimeter of the Project area, with an access gate in the southwesterly corner of the site at the access road and immediately north of the Project substation. The security fence would be 8 feet high and have an overall height of no more than 12 feet from the bottom of the fabric to the top barbed wire. The fence would have top rail, bottom tension wire, and three strands of barbed wire mounted on 45-degree extension arms. Posts would be set in concrete. The security fence will be installed near the start of construction but may be preceded by mowing and or vegetation clearance as required. The on-site substation would be surrounded by 12-foot security fencing and locked gates. All required laydown areas are expected to be contained within the defined Project boundaries, and thus no additional temporary fencing would be required. Additional gates may be installed to provide access in the event of an emergency.

1.4.5 Operations and Maintenance (O&M) Building

The onsite O&M building would be located within the southwesterly portion of the site in the laydown yard area near the main entrance to the Project and would consist of a 120-foot-wide by 240-foot-long prefabricated building set on concrete slab-on-grade that would be poured in place. The building would be an estimated 19 feet tall at its highest point. The facility would be designed for Project security, employee offices, and parts storage.

1.4.6 Gen-Tie Line

The Project's gen-tie route would remain the same as described and analyzed in Revision 5 of the existing Plan of Development (POD), as was proposed in the Palen Solar Energy Generating Station (PSEGS) project. Detailed plans to interconnect via a stand-alone gen-tie transmission line inclusive of the required electrical interconnection facilities would be developed in coordination with CAISO requirements and finalized prior to construction. Approximately six (6) temporary construction pull-sites for purposes of stringing the gen-tie line would be required.

1.4.7 Temporary Construction and Staging Areas

The staging area would include temporary construction trailers for the management of the construction, a parking area, and site security facilities. The Applicant has specified the

southwesterly corner of the Project for this area. This area would accommodate delivery of materials, vehicles, etc. Material deliveries for the solar field would be ongoing, and panels and framing structures would be delivered throughout the solar field adjacent to the subunit locations. Portable latrines would also be located in this area.

Temporary staging areas for material laydown including boxes of solar panels, steel, aluminum framing, conduit for underground electrical, transformers, and other materials would be located throughout the Project area. The laydown areas would be subsumed by the build-out of the panel array with some exceptions. Laydown areas would not be required within the solar field as such. Materials such as boxes of panels, steel and aluminum framing, etc. would be laid out between rows of panels and along the access roads.

1.4.8 Site Preparation

The Project would use construction site preparation techniques that prepare the site for safe and efficient installation and operation of PV arrays.

The Applicant proposes to use site preparation techniques that would minimize the required volume of earth movement, including a "disc and roll" technique that uses grading equipment to till the soil over much of the solar facility site and then roll it level, as well as "micro-grading" or "isolated cut and fill and roll" of other areas of the site to trim off high spots and use the material to fill in low spots.

Much of the solar field would be impacted by some form of soil disturbance, either from compaction, micro-grading, or disc-and-roll grading. Scarifying, where required, would disturb the soil to several inches and potentially allow some roots to remain to assist in soil stabilization and reduce the possibility of erosion.

The Applicant will minimize grading and vegetation removal for the Project. When feasible, construction activities will implement drive and crush rather than grading. Construction equipment would drive over and crush native plants to minimize impacts to the roots of desert shrubs. Drive and crush is expected to reduce the recovery time of desert shrubs within the temporary construction areas. Mowing and/or trimming will be implemented wherever possible, allowing some native vegetation to remain in place under the PV panels.

Solar tracking and framing structures will generally follow the existing land contours with localized grading utilized only where necessary to address major variations in topography in areas that would not significantly impact existing vegetation or surface hydrology. Site grading within the Project site will be localized in nature and limited to major access roads (described in Section 1.4.3 above), inverter pad locations, lay down areas, internal and external transmission poles, and ancillary facilities (including parking area, material storage, operations and maintenance building and substation).

As described above, trenches will be excavated for electrical conductors that connect the PV modules and the inverters to the substation. The PV modules would be electrically connected by wire harnesses and combiner boxes that would collect power from several rows of modules and feed the Project's power conversion stations via direct current (DC) cables placed in underground covered trenches.

With regard to California Department of Fish and Wildlife (CDFW) jurisdictional streambeds, localized grading will be required to allow vehicle access when the slope is greater than 1 percent at the boundaries of delineated CDFW jurisdictional streambeds and the streambed is deeper than 12 inches (i.e., too steep for vehicles to traverse unassisted). Additionally, grading within CDFW jurisdictional streambeds is anticipated to only occur when no other equally-sound method of engineering will allow development of the Project at an equal or lesser cost than grading. Grading within CDFW jurisdictional areas with occur in accordance with the permit requirements. Temporarily disturbed areas will be revegetated.

Best Management Practices will be employed to prevent loss of habitat due to erosion caused by Project-related impacts (i.e., grading or clearing for new roads). All detected erosion will be remedied within 2-days of discovery. Additionally, fueling of equipment will take place within designated areas and not within or adjacent to drainages or native desert habitats. Contractor equipment will be checked for leaks prior to operation and any identified leaks will be repaired immediately.

Access roads would be moderately graded to allow regular access with a small vehicle. Where temporary access is needed to install facilities, such as along the perimeter fencing, no removal of existing vegetation or grading would occur. Instead, equipment would drive over or around existing desert scrub vegetation without direct removal. As noted above, crushed vegetation is more likely to recover faster than where vegetation is removed and reseeded, or where soils are disturbed. Revegetation with native species would be implemented where feasible in areas of temporary disturbance.

Continued weed management in cleared areas would be maintained through regular monitoring and targeted application of the herbicide glyphosate, which is approved for use on BLM lands and/or by occasional blading. Some vegetation may be allowed to grow back among the field of solar panels. Additional soil disturbance by regular operations of the plant is not expected. The Project would implement a Weed Management Plan (WMP). The WMP would tier from the BLM's 2007 Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement and would describe applicable regulations for the use of herbicides on federally managed lands in California, and provide the basis for proper management and use of herbicides at the site. The WMP would include weeding, annual pruning, and soil monitoring if necessary. Weeding would

occur frequently during the initial growth period to ensure that invasive plants do not mature and set seed. Weeding activities would follow the approved WMP. Once revegetated native plant species are established in the temporarily disturbed areas at the site, weeding frequency would drop to less frequent levels. Native vegetation would be allowed to re-grow within the solar panel field to the extent that it does not interfere with the panels themselves (no higher than 18 inches) to avoid growing into electrical connections and creating a fire hazard, or disrupting the panel's performance. The access roads would be kept clear of vegetation through the use of targeted herbicide spraying, occasional scarifying, or weeding to reduce fire hazard and allow access to the panel arrays.

2 SITE CHARACTERISTICS

The following descriptions are primarily sourced from the California Energy Commission (CEC) Revised Staff Report (CEC 2010) and Palen Solar Power Project (PSPP) PA/FEIS (BLM 2011).

2.1 Regional Setting

The Project site is located in the central portion of Chuckwalla Valley, an area east of Palm Springs in the Colorado Desert. The elevation of Chuckwalla Valley ranges from under 400 feet at Ford Dry Lake to approximately 1,800 feet above mean sea level (amsl) west of Desert Center and along the upper portions of the alluvial fans that surround the valley perimeter. The surrounding mountains rise to over 3,000 feet amsl. The topography of the Project site generally slopes downward to the southeast at a slight gradient of less than 1 percent. Ground surface elevations at the Project site itself range from approximately 680 feet amsl in the southwest to 425 feet amsl in the northeast. Steeper grades are present at isolated sand dunes along the northern portion of the site.

Existing anthropogenic features and private land uses exist in the vicinity of the Project site includes agricultural, residential, renewable energy, energy transmission, historical military, and recreation development. Much of the agriculture has waned in the past 10-15 years, including most of the aquaculture (fish farms) and jojoba ventures; however, several crops are still grown, including a citrus orchard and date palm orchard just west of the Project site. Approximately 1,600 acres of private lands occur within one mile west of, and immediately adjacent to, the Project site. Approximately 830 acres of these private lands currently support active agricultural practices on converted natural desert habitat.

Evidence of historical military use from the 1942 Desert Training Center, California-Arizona maneuvers can be found in the Project vicinity. There are also many tracks of four-wheel-drive vehicles near the freeway, presumably made during freeway construction, that have disrupted the surface and are clearly evident in the interfluvial desert pavement.

The I-10 is located just south of the Project site. The developed footprint of I-10 and associated wing dikes and bridges have altered natural habitat within and adjacent to the freeway. These alterations have likely resulted in changes to surface hydrology and condition of natural habitat within the Project site over time. These alterations are discussed further herein with regard to biological and hydrological resources.

2.2 Hydrology

The Project site occurs within the Chuckwalla Valley Drainage in the Colorado River Hydrologic Basin Planning Area. Palen Dry Lake and Ford Dry Lake represent the lowest elevations within the basin. Desert washes within this region contract and expand dramatically in size due to extreme variations in flow, which can range from high-discharge floods to periods when surface flow is absent. The Project site lies between the alluvial fans emanating from the Chuckwalla Mountains to the south, the Coxcomb Mountains to the north, and the Palen Mountains to the northeast. The Project site resides in the lower reaches of the neighboring alluvial fans and is characterized by less stabilized soils consisting of finer sand and silt as compared to the upper alluvial fan reaches that support stabilized, rocky soils with well-defined channels.

Alluvial processes across the majority of the site generally flow from southwest to northeast. To the south, the I-10 was constructed over 45 years ago across the alluvial fan outlet of Corn Springs Wash (CEC 2010). Interstate 10 and associated wing dikes have altered natural surface flows from dozens of meandering small alluvial washes into concentrated discrete channels. Flows associated with the alluvial fan emanating from the Chuckwalla Mountains (primarily associated with the Corn Springs Wash system) are routed under the I-10 via three bridge spans and enter the Project site. Measurements of these spans were conducted during wildlife connectivity surveys and analysis: Underpass 10 is 3.0 meters high, 30.1 meters wide, and 60.3 meters in length; Underpass 11 is 3.3 meters in height, 24.3 meters wide, and 58.4 meters in length; and Underpass 12 is 3.3 meters in height, 17.3 meters wide, and 57.8 meters in length (Solar Millennium 2010b). The westerly bridge (Underpass 10) near Corn Springs Road Interchange conveys flow from the main branch of Corn Springs Wash to the northwest corner of the site. This channel supports the most substantial flow depth of the three; however, the prominent channels eventually spread out into numerous small channels within the relatively flat topography to the north of the I-10 (CEC 2010). Underpasses 11 and 12 convey flows to the center and east side of the Project site respectively.

2.3 Soils

The Project site supports two general soil types per the United States General Soil Map: (1) the Rositas–Dune land–Carsitas map unit and (2) the Vaiva-Quilotosa-Hyder-Cipriano-Cherioni map unit (CEC 2010). The Rositas-Dune land-Carsitas map unit occurs on the northeastern 32 percent of the site and is characterized by soils with a very high sand percentage (greater than 95 percent) and is highly susceptible to wind erosion. The remaining 68 percent of the site was mapped as the Vaiva-Quilotosa-Hyder-Cipriano-Cherioni map unit characterized by soils with high percentage (greater than 65 percent) of sand with moderate susceptibility to wind erosion.

These data were used in conjunction with field observations and laboratory testing conducted as the result of field reconnaissance to better characterize the soils on site (CEC 2010).

Soil profiles observed in the test pits were typically sands, and laboratory analysis measured sand content from 83 to 94 percent. Silt content measured in the soils ranged from 2 to 8 percent, and clay content from 2 to 11 percent. Observed profiles exhibited a range of effervescence from none to slight in the top layers, but effervescence increased with depth indicating increasing percentages of carbonates (CEC 2010).

2.4 Rainfall

Measurements of precipitation during winter (October through March) and summer (April through September) periods are important in determining the efficacy of both desert tortoise and special status plant surveys. Data was obtained from the Western Regional Climate Center (WRCC 2016) for the most proximate stations to the Project site: Blythe Airport and Eagle Mountain weather stations (approximately 26 and 13 miles from the Project site, respectively). Historical rainfall data from 2009 to 2017 were totaled and averaged (Table 1). Over the period of analysis, the highest winter rainfall occurred in 2010 and highest summer rainfall occurred in 2012. Since 2014, annual winter and summer rainfall has measured less than 50% compared to the peaks in 2010 and 2012.

Table 1 - Regional Rainfall Totals Since 2009

Year	October to March (inches)	April to September (inches)
2009	2.4	0.2
2010	4.8[1, 2]	0.1
2011	2.5	1.2
2012	1.0	3.3[1]
2013	1.5	2.6
2014	0.7	1.2
2015	2.1	1.3
2016	1.5	0.7
2017	3.4	n/a

[1]Maximum average recorded winter and summer rainfall during 2009 – 2017

[2] Includes 0.72 inches in October 2010.

2.5 Sand Transport System

Sand transport within the Chuckwalla Valley region involves an interaction between hydrological (alluvial and fluvial) and aeolian (wind-blown) processes (Philip Williams and Associates [PWA] 2010, Kenney 2010, Desert Research Institute [DRI] 2013, Palen Solar Holdings [PSH] 2013, and Lancaster et al. 2014). The sand transport system located in the

Chuckwalla Valley has been the subject of several previous studies. Studies have centered on two distinct objectives; (1) characterizing the existing conditions of sand transport, including evaluating the patterns of sand migration, and (2) assessing the potential impacts of solar development on the sand transport system resulting from proposed solar facilities.

The Chuckwalla Valley Drainage System includes Palen Dry Lake and Ford Dry Lake, which represent the lowest elevations within the basin. Alluvial fans that emanate from the neighboring mountain ranges including the Chuckwalla Mountains, Coxcomb Mountains, and Palen Mountains entrain sediments during periods of surface flow and deposit sediments downstream. Larger sediments fall out higher in the alluvial fan, while finer sand is deposited further down the alluvial fan. At the lowest reaches of alluvial wash system along the edges of the valley basins, finer sand accumulates and is subject to wind erosion, becoming a source of sand within a larger aeolian sand transport corridor (PWA 2010).

Within the Chuckwalla Valley, sand accumulates within three primary aeolian sand transport corridors: (1) Dale Lake-Palen Dry Lake-Ford Dry Lake sand migration corridor along the Chuckwalla Valley; (2) Palen Valley-Palen Dry Lake sand migration corridor where sand is transported southeast along the Palen Valley; and (3) Palen Pass-Palen-McCoy Valley sand migration corridor, located between the Palen and McCoy Mountains, where sand is transported in a southerly direction/towards the Chuckwalla Valley (BLM 2011). Prevailing winds in this region vary seasonally, and indicate two dominant wind directions during typical years. During the spring and summer months, the strongest winds are associated with monsoonal storm events, and come from the south. During the fall and winter months, the prevailing winds are associated with Pacific Ocean derived weather patterns, and come from the north-northwest. Regional aeolian system studies indicate that the prevailing wind responsible for aeolian sand transport was locally influenced by mountain range topography (BLM 2011). Sand delivered from upwind is deposited, replenishing sand that has been lost downwind (CEC 2014a). Additional sand is added to corridors from local wind corridors that can be thought of as 'sand corridor tributaries' and by fluvial sources. The activity and location of sand transport corridors are not fixed in time or space. Sand corridors can expand, contract or migrate with changing weather and climate (PWA 2010).

The Project site is located within and adjacent to the Palen-Ford sand migration corridor, which is part of the Clark's Pass sand ramp running from northwest to southeast from the Dale Lake playa, north of Joshua Tree National Park (San Bernardino County), to sediment sinks in the Palen-Ford dune field in Sonoran Desert of Riverside County (Zimbelman et al. 1995). Aeolian processes play a major role in the creation and establishment of sand dune formations and habitat in the Chuckwalla Valley (BLM 2011). Winds enable the sand ramp to surmount topographic barriers that otherwise separate the Dale Lake Basin and the Palen-Ford Basin.

At a finer scale, the Project site and adjacent lands have been characterized by four relatively discrete sand transport zones (Kenney 2010) that vary along a southwest to northeast gradient in the degree of aeolian sand transport present (Figure 3). The Project site transitions from a currently stable coarse gravel alluvial fan surface with some relict sand dunes that have largely deflated (blown away) in the southwest extent, to more active wind-blown sand with relatively shallow sand deposits, and finally an area of deeper and more active vegetated sand dunes in the northeastern extent and outside the Project site. An updated assessment using high resolution satellite imagery compared two images from June 21, 2010 and April 16, 2016. The zones described by Kenney (2010) were used for reference to detect any major changes in surface conditions. RGB-alpha channels, contrast and brightness settings were adjusted using Geographic Information Systems (GIS), similarly between both images. Figure 4 illustrates the comparison of the soil surfaces between 2010 and 2016 and indicates that the extent of relatively fine sand (displayed as magenta) was consistent between the two images.

On behalf of the California Energy Commission (CEC) in 2010, PWA provided independent mapping of sand transport land units within the project area and acknowledged agreement with the delineation of sand transport zones mapped by Kenney (2010), except for the eastern limit of Zone I and degree of sand transport within Zones I and II (both outside the Project boundary). The authors noted that the zones were 'interwoven and gradual' and that hydrological and aeolian processes on the site occurred as a gradient, from southwest to northeast. PWA (2010) also provided valuable context to the dynamic nature (expansion and contraction) of the sand transport corridors that result from annual cycles of wet and dry conditions:

> *The activity and location of sand transport corridors is not fixed in time or space. Fluvial delivery of sediment from mountain fronts to the alluvial fans, troughs and playas tends to occur in wet winters associated with El Niño events that occur on average every 3-5 years. Due to the wet conditions wind transport may be less active during these years, so sediment may be temporarily stored in downstream channel areas or playas. During La Niña events (also approximately every 3-5 years) winters tend to be drier, promoting wind transport and aeolian processes. Fluvially delivered sand deposited in channels or playas during an El Niño event can be transported by the wind during a subsequent La Niña event. In an analogous manner, sand corridors can expand, contract or migrate with changing weather and climate. Wetter than average conditions may allow vegetation to encroach on the edges of a sand transport corridor, thinning it; dryer or windier condition may add more sand to the corridor and bury vegetation, widening the corridor. Changes in prevailing wind direction or strength may change the location or intensity of sand transport.*

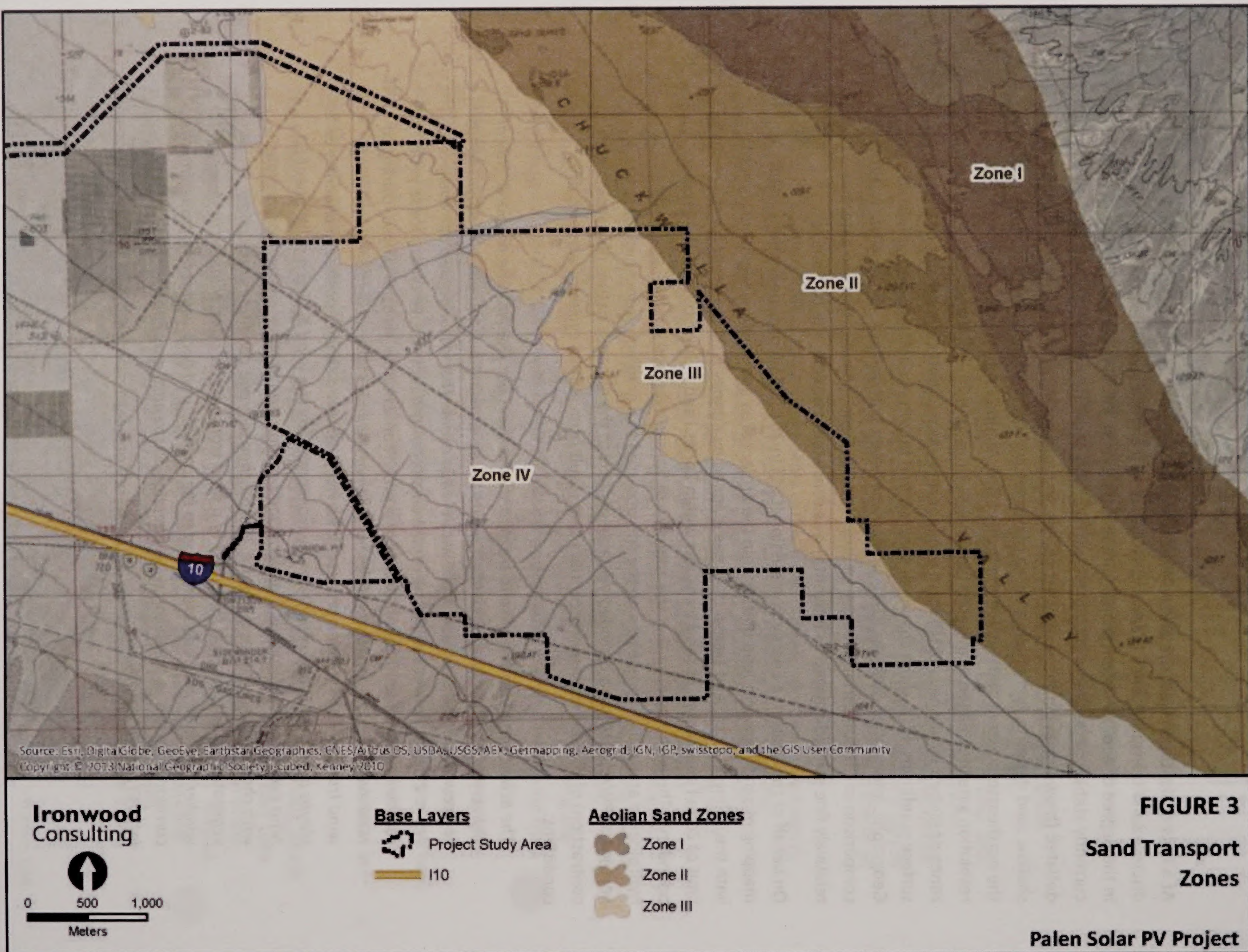

FIGURE 3

Sand Transport Zones

Palen Solar PV Project

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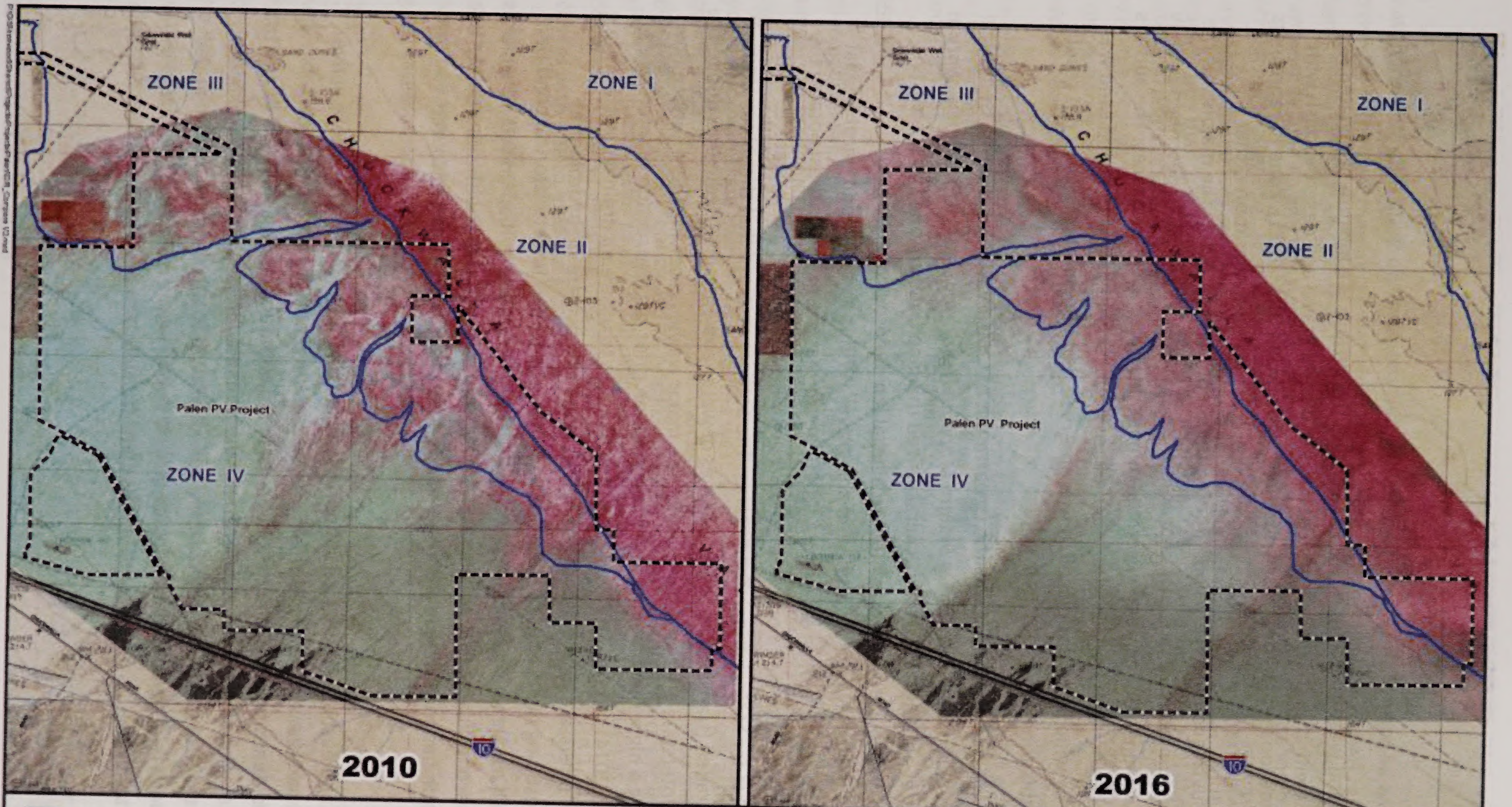

Aeolian Sand Zones

Palen PV Project Study Area

Layer Properties - Symbology Settings

RGB Composite
Red = Band 4, Green = Band 1, Blue = Band 2, Alpha = Band 3
Stretch = ESRI, Statistics 'From Each Raster Dataset'
Contrast = 60, Brightness = 0, Transparency = 0

0 1,500 3,000 Feet

PALEN PHOTOVOLTAIC SOLAR PROJECT

Figure 4

High Resolution Imagery Soil Assessment

Zone IV

In the southern and western extent of the Project site, the surface is a mixture of deflated vegetated dunes with thin coarse sand and patches of alluvial gravel and desert varnish with little available fine loose sand for transport to dunes downwind (BLM 2011). Zone IV represents an area where wind transport is not the significant process for sand migration rather hydrological (alluvial and fluvial) erosion is more prominent (Kenney 2010). The majority of the Project site (approximately 71 percent) is located within Zone IV. PWA (2010) described Zone IV as the mid-alluvial fan with degraded vegetated dunes and coarse alluvial surfaces. The authors noted that patches of vegetated, deflated sand dunes occurred within this zone and sand was being removed by wind but not replaced. It was observed that fine, loose sand was not readily present within this zone.

In conjunction with the DRECP process, the Department of Conservation's California Geological Survey (CGS) prepared a regional *Eolian System Mapping Report for Eastern Riverside County in 2014* (Lancaster et al. 2014). The report characterized the map units in Zone IV as consisting primarily of Qyf, which is described as modern alluvial fan deposits consisting of 'unconsolidated to slightly consolidated sand and gravel'. Within this map unit, local alluvial fans serve as a source of aeolian sand. PWA (2010) noted that the major washes, notably the central major wash, supported bordering sandy zones within one mile of Interstate 10 that appeared suitable for Mojave fringe-toed lizards. The authors asserted that the minor washes were likely degraded (transporting lower volumes of water and entrained sediment) due to the obstruction of Interstate 10 and, subsequently, the major washes receiving more surface flow, thus distributing a higher volume and fine sediment than prior to construction of Interstate 10. Lancaster et al. (2014) noted, like PWA (2010) that changes to upstream drainage patterns (e.g., construction of Interstate10 and associated dykes) result in downstream hydrological degradation, resulting in portions of the alluvial fan less active than under historical conditions. Lancaster et al. (2014) mapped the major washes that bisect Zone IV as map unit (Qw), which is described as unconsolidated fine to coarse-grained sand and sandy gravel with subordinate fine sand and silt with bar and swale morphology and is noted as an active aeolian source.

Zone III

Moving north and east the fan surface supports sandier conditions with slightly more active wind-blown sand area with relatively shallow sand deposits. Zone III supports shallow vegetated sand dunes and sand sheets that are deflated, although less than in Zone IV and that this zone contains more abundant sand than the dunes in the mid-alluvial fan. Approximately 23 percent of the Project site is located within Zone III. PWA (2010) asserted that the dunes appeared to be in relative equilibrium; losses of sand due to wind erosion were matched by deposition of sand from upwind; however, this contrasts with Kenney (2010) and PSH (2013) in

that there were consistent observations that aeolian landforms within this zone were more extensive in the past than at present and that alluvial processes have disturbed relic sand dunes. PWA (2010) maintained that there was evidence of moderate levels of aeolian sand transport in Zone III, and this surface appears to form the outer zone of the sand transport corridor. Lancaster et al. (2014) provided additional observations of aeolian activity within the zone and mapped two relatively small units ranging from stabilized to active windblown deposits less than 1.5m thick. Due to the scale of mapping, Lancaster et al. (2014) provided additional context about the margins of the sand transport corridors by asserting these areas may have experienced a period of inactivity and substantial interactions (intergrading of fluvial erosion, active sand sheet accumulation, and aeolian dune formation) occur near the lower reaches of alluvial fans.

The high-resolution satellite imagery comparison between 2010 and 2016 reveals that the western boundary of Zone III corresponds well with the surface soil conditions and follows the topographical features derived from the mid-alluvial fan.

<u>Zone II</u>

Active aeolian sand migration occurs in migration corridors located along the northeastern boundary of the Project site. The vegetated dunes become deeper and the sand becomes more abundant in Zone II (PWA 2010). This area has hummocky vegetated dunes with greater topographic expression than the zone to the west, implying that they are more actively supplied by sand. This portion of the sand transport corridor is more active than the shallow vegetated sand dunes (Kenney 2010). Approximately 6 percent of the Project site is located within Zone II. Lancaster et al. (2014) mapped Zone II as Qe, which is described as active windblown deposits consisting of dunes and sand sheets typically greater than 1.5 m in thickness with fine to medium grained sand.

The high-resolution satellite imagery comparison between 2010 and 2016 reveals that the western boundary of Zone II is distinct and consistent between both years (Figure 4). The western boundary of Zone II near the Project site has not substantially changed since the original assessment in 2010.

<u>Zone I</u>

Zone I is located outside and northeast of the Project site. This area has the greatest rate, most active, of sand transport of the four zones. Zone I supports active transverse dunes that are not stabilized and range from 8 to over 20 feet high. This area and portions of Zone II are included in the Palen Dune system. Potter and Weigand (2016) performed a comprehensive review of Landsat image spectral data between 1985 and 2014 to evaluate sand dune migration within the Palen Dunes. The study area was situated within the active dunes with sampling transects

that were outside the Project boundary, apart from the southern-most transect that was located adjacent to the northern Project boundary. During the 30-year period of analysis, the study found that the aerial extent of the Palen Dunes had grown by 47%, active dune aerial extent had grown by 60%, and scattered bush decreased by approximately 18%. The authors estimated that the Palen dune had migration rates up to 50 m per year, with most active rates in 2014 and least active rates in 1995. These measurements were greatest in the middle of the Palen Dunes, with are located greater that two kilometers north of the Project site. The models indicated negligible dune formation within the periphery of the Palen Dunes, where the Project site is located. Potter and Weigand (2016) asserted that no active threats to energy facilities at Chuckwalla Solar I and the Palen Solar I [approximate location of the Palen Solar PV Project] was evident and that the leading edge of sand accumulation in 2014 remained greater than two kilometers from the Project site.

2.6 Vegetation

2.6.1 Natural Communities

The Project site consists almost entirely of four natural vegetation communities (Figure 5 and Table 2). Vegetation communities in the Project area were classified by Holland (1986) and cross-referenced with *A Manual of California Vegetation, 2nd edition* (Sawyer et al. 2009) and the National Vegetation Classification System (NVCS) referenced in the DRECP. Two communities (desert dry wash woodland and unvegetated ephemeral wash) that occur within the Project site are considered sensitive due to their association with alluvial processes and likely State water jurisdiction. One community (stabilized and partially stabilized desert dunes) that occurs within the Project site is considered sensitive due to its association with aeolian processes. Other sensitive groundwater-dependent vegetation communities described under PSPP (BLM 2011; CEC 2010) include honey mesquite woodlands, alkali (desert) sink scrubs, sparsely vegetated playa lake beds, and jackass clover. These vegetation types do not occur within the Project site and are not discussed in further detail herein.

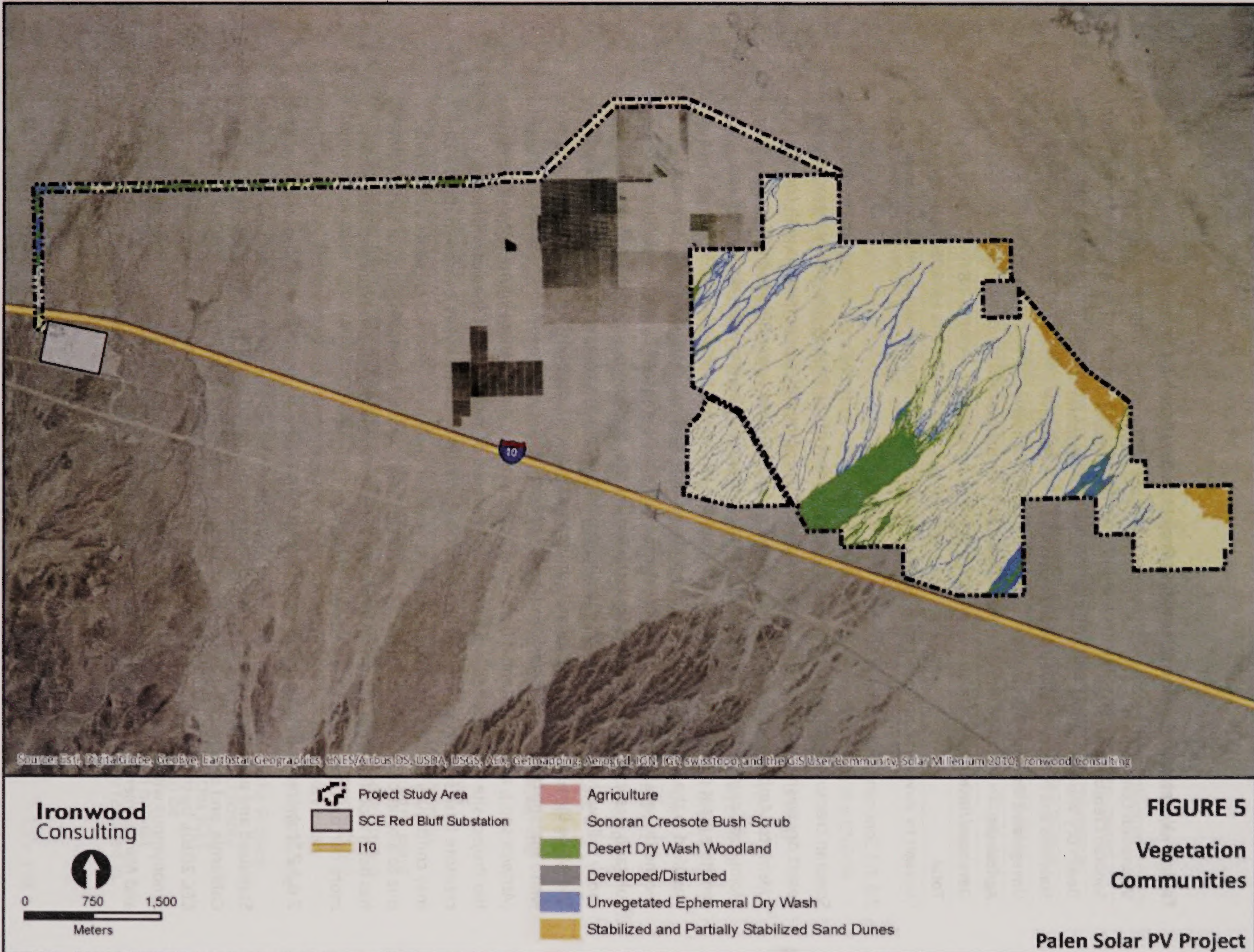

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Table 2 - Vegetation Communities within Project Survey Area[1]

Vegetation Communities	Community	Area (acres)
Sonoran Creosote Bush Scrub	Upland	3,362
Desert Dry Wash Woodland	Sensitive	322
Stabilized and Partially Stabilized Desert Dunes	Sensitive	123
Unvegetated Ephemeral Dry Wash	Sensitive	335
Agriculture	Upland	6
Developed/Disturbed	Upland	8
Total		**4,156**

[1] Acreages for survey area, not impact areas, and includes solar facility and 300-foot wide gen-tie survey areas.

2.6.1.1 Sonoran Creosote Bush Scrub

Sonoran creosote bush scrub habitat characterizes most of the Project site and intergrades with desert dry wash woodland along desert washes. This community is synonymous with *Larrea tridentata -Ambrosia dumosa* alliance (Sawyer et. al 2009) and *Lower Bajada and Fan Mojavean-Sonoran Desert Scrub* (NVCS). This vegetation community is not designated as a sensitive plant community by BLM (NECO Plan) but has a State Rarity rank of S5, and is classified in the DRECP (CEC 2014c). Sonoran creosote bush scrub occurs on well-drained, secondary soils of slopes, fans, and valleys and is the basic creosote bush scrub habitat of the Colorado Desert (Holland 1986). Within the Project site, this community is characterized by sandy soils with a shallow clay pan. Dominant plants within this community are creosote bush and white burr-sage. Other occasional components include indigo bush (*Psorothamnus* spp.), white rhatany (*Krameria bicolor*), Anderson's desert thorn (*Lycium andersonii*), Saltbush (*Atriplex* spp,), and a rich annual flora. Past anthropogenic disturbances within the vicinity of the Project site have resulted in a substantial presence of invasive plant species within the creosote bush scrub community. The I-10 and associated diversion dykes located south of I-10 may contribute to the overall sparse vegetative cover and low diversity of creosote bush scrub due to alteration of historical alluvial flows (BLM 2011). As a result, the majority of surface flow has been modified from occurring within the broader fan and is presently concentrated within more narrow channels as they cross under the I-10.

2.6.1.2 Stabilized and Partially Stabilized Desert Dunes

Stabilized and partially stabilized desert dunes are considered sensitive by the state of California, and are classified as S3 in the California Natural Diversity Database (CNDDB 2016; CEC 2010), by the BLM (NECO Plan) and within the DRECP (CEC 2014d). This community is synonymous with *Dicoria canescens - Abronia villosa* Desert Dunes alliance (Sawyer et. al 2009) and *North American Warm Desert Dunes and Sand Flats* (NVCS).

These dune systems consist of sand accumulations in the desert that have stabilized or partially stabilized as evergreen and/or deciduous shrubs and scattered, low grasses have colonized. These dunes retain water just below the sand surface. Water availability allows deep-rooted, perennial vegetation to survive during longer drought periods (Holland 1986). This community occurs within the margins of Palen Dry Lake and extends into the eastern edge of the Project study area. Dominant plants within this community included creosote bush, big galleta grass (*Hilaria rigida*), desert twinbugs (*Dicoria canescens*), desert sand verbena (*Abronia villosa*) and dyebush (*Psorothamnus emoryi*). Desert sand dunes provide unique habitats that often support plants, mammals, reptiles and insects that are restricted to sand dunes.

2.6.1.3 Desert Dry Wash Woodland

Desert dry wash woodland is a sensitive vegetation community recognized as S4 by the CNDDB and the BLM (NECO Plan) and the DRECP (CEC 2014d). As described in supporting documentation for PSPP (BLM 2011; CEC 2010), desert dry wash woodland habitat is likely regulated by CDFW as State waters. This community is synonymous with blue palo verde (*Parkinsonia florida*) - ironwood (*Olneya tesota*) (microphyll) woodland alliance (Sawyer et. al 2009) and *Sonoran - Coloradan Semi Desert Wash Woodland / Scrub* (NVCS). Desert dry wash woodland was mapped consistent with the *Vegetation Survey and Classification for the Northern & Eastern Colorado Desert Coordinated Management Plan* (CNPS 2007). Holland (1986) describes this community as an open to relatively densely covered, drought-deciduous, microphyll (small compound leaves) riparian scrub woodland. These habitats often are supported by braided wash channels that change patterns and flow directions following every surface flow event (CEC 2010). Desert dry wash woodland provides habitat for common and special status wildlife species.

Within the Project site, this vegetation community is dominated by an open tree layer of ironwood (*Olneya tesota*), with occasional blue palo verde, and smoke tree (*Psorothamnus spinosus*). Ironwood, palo verde, and smoke tree are desert phreatophytes (deep-rooted plant that obtain water from a permanent ground supply or from the water table). The understory is a modified creosote scrub with big galleta grass (*Hilaria rigida*), cheesebush (*Ambrosia salsola*), desert lavender (*Hyptis emoryii*), and occasional Russian thistle (CEC 2010). Desert dry wash woodland is associated with the three wash systems that are channelized under the I-10. As the washes flow northeast, they become less defined within the flatter topography of the Project site. Desert dry wash woodland eventually is replaced by smaller washes of mixed creosote bush and big galleta grass, and a mixture of other upland and wash-dependent species (CEC 2010). Outside the three major wash systems, desert dry wash woodland appears to be declining, evidenced by a relative decrease in the cover, vigor, diversity, and overall habitat function, due to hydrological alterations associated with the I-10 freeway that likely resulted in

reduced water supply to the broad network of channels that once crossed the Project site (CEC 2010).

2.6.1.4 Unvegetated Ephemeral Dry Wash

In the Project site, the smaller channels lacking desert dry wash woodland consist of a sparse to intermittent cover of shrubs and perennial herbs. These habitats are likely regulated as State waters. These smaller channels are subject to frequent channel avulsion and highly variable flow pathways contained within broad active alluvial fans. Vegetative cover typically occurs adjacent to the channels and consists largely of mixed upland and wash-dependent perennial herbs in a community of creosote bush and big galleta grass, occurring along the banks and within the desert dry wash woodland interfluves. To a lesser extent compared to desert dry wash woodland habitats, ephemeral dry washes may support wildlife use by small and large mammals as movement corridors; they also may provide a food and water source for many species of migrating songbirds, raptors, and reptiles (CEC 2010).

2.6.1.5 Agriculture

Agricultural land is not a natural vegetation community described by Holland (1986) or Sawyer and Keeler-Wolfe (2009). Areas of active and fallow agricultural fields occurred within the buffer of the Project site, within the biological survey area, and outside the Project disturbance area. The majority of the lands mapped as agriculture consist of date palm plantations located northwest of the proposed solar facility and south of the gen-tie alignment. A portion of the mapped agricultural land consisted of fallow fields where ruderal vegetation has recolonized with exotic plant species interspersed with sparse native vegetation (CEC 2010). Fallow and active agriculture fields may provide forage and cover for local and migratory wildlife, especially in areas that are actively irrigated (CEC 2010).

2.6.1.6 Developed/Disturbed

Developed and disturbed areas consist of existing roads including Interstate 10, Corn Springs Road, and unnamed dirt roads that are actively being used under current conditions.

2.6.2 Invasive and Noxious Weeds

Noxious and invasive weeds are species of non-native (exotic) plants included on the weed lists of the California Department of Food and Agriculture (CDFA), the California Invasive Plant Council (Cal-IPC), or those weeds of special concern identified by the BLM. They are of concern in wild lands because of their potential to degrade habitat and disrupt the ecological functions of an area (Cal-IPC 2016). Non-native plant species recorded as part of project botanical surveys during 2009, 2010, and 2016 were primarily located in the eastern and southern extent of the Project site (CEC 2010).

Sahara Mustard (*Brassica tournefortii*)

Sahara mustard is a dicot of the mustard family, native to the deserts of North Africa, the Middle East, and the Mediterranean regions of southern Europe (Bossard et al. 2000). Initial establishment of this species in California occurred through the importation of date palms from the Middle East to the Coachella Valley during the early 1900s (Bossard et al. 2000). Sahara mustard currently occurs across Riverside County, as well as all neighboring counties (Cal-IPC 2016). Sahara mustard is considered by Cal-IPC to have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure, as well as having reproductive biology and other attributes that are conducive to moderate to high rates of dispersal and establishment (Cal-IPC 2016). Sahara mustard is not listed on the California Department of Food and Agriculture (CDFA) Noxious Weed List (CDFA 2016). This species was found in disturbed areas throughout Sonoran creosote bush scrub habitat within the Project site (BLM 2011).

Russian Thistle (*Salsola tragus*)

Russian thistle is a dicot, annual herb that is found in open and disturbed areas in the Mojave Desert and throughout western North America (MacKay 2003). Otherwise known as tumbleweed, this annual becomes large and round with age, breaking off and rolling with the wind to aid in seed dispersal. Native to Eurasia, this plant was probably introduced around the turn of the century, is salt tolerant, and can be found in both dry and wetland habitats (CDFA 2016). Russian thistle has a Limited-to-Moderate rating by the Cal-IPC, indicating a species that is invasive but has an ecological impact that is minor on a statewide level, or there was not enough information to justify a higher score. Its reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but it may be locally persistent and problematic. Russian thistle is listed on the CDFA Noxious Weed List, making it subject to State laws and regulations regarding its spread and pollution of an area (CDFA 2016). Russian thistle was found in several habitat types in the Project site, including dune, desert scrub, desert dry wash woodland, and Sonoran creosote bush scrub (BLM 2011).

Tamarisk or Saltcedar (*Tamarix ramosissima*)

Tamarisk or saltcedar was observed interspersed throughout desert dry wash woodland within the Project site. This species continues to be a BLM weed species of concern, to have a Cal-IPC inventory rating of Highly invasive, and a CDFA "B" rated species, meaning it is a pest of known economic or environmental detriment of limited distribution.

Mediterranean grass (*Schismus* spp.)

Mediterranean grass is an annual monocot grass found in both central and southern California, particularly in disturbed areas and deserts, probably introduced at the turn of the century (CDFA 2016). Cal-IPC considers this plant to have limited invasive potential. *S. barbatus* and *S. arabicus* contribute to increased fire threat due to lack of decomposition during dry seasons. Because of its aid in the destruction of native shrub species by wildfire, both species contribute to the type-conversion of desert shrubland into annual grassland. Mediterranean grass has a Limited rating indicating it is invasive though its ecological impacts are minor on a statewide level, or there was not enough information to justify a higher score. These species' reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited. Spread may occur due to soil disturbance and vegetation cutting, which could disperse seeds, as well as from vehicle tires and footwear. Increase of these species is most likely to occur in areas where this species already exists. Mediterranean grass is not listed on the CDFA's Noxious Weed List (CDFA 2016). Mediterranean grass is prevalent throughout Sonoran creosote bush scrub within the Project site. BLM and other agencies recognize that because of the widespread distribution of Mediterranean grass, this species is not considered feasible to eradicate.

2.6.3 Cacti, Yucca, and Native Trees

Native cacti, succulents, and native trees are not special status plant species but the harvesting of these native plants is regulated under the California Native Plant Protection Act (Fish and Game Code §§1900-1913) and the California Desert Native Plant Act of 1981 (Food and Agricultural Code § 80001 et. seq.; Fish & Game Code §§1925-1926). A total of five species in the Cactaceae family were observed within the solar facility boundary, including hedgehog cactus, (*Echinocactus engelmannii*), teddybear cholla (*Cylindropuntia bigelovii*), silver cholla (*C. echinocarpa*), pencil cholla (*C. ramosissima*), and common fishhook cactus (*Mammillaria tetrancistra*). Two additional succulent species were observed along the gen-tie including California barrel cacti (*Ferocactus cylindraceus*) and cottontop cactus (*Echinocactus polycephalus*). Additionally, ocotillo (*Fouquieria splendens* ssp. *splendens)* and three species of native trees were found within the Project site, which included smoke tree, ironwood, and blue palo verde.

3 METHODS

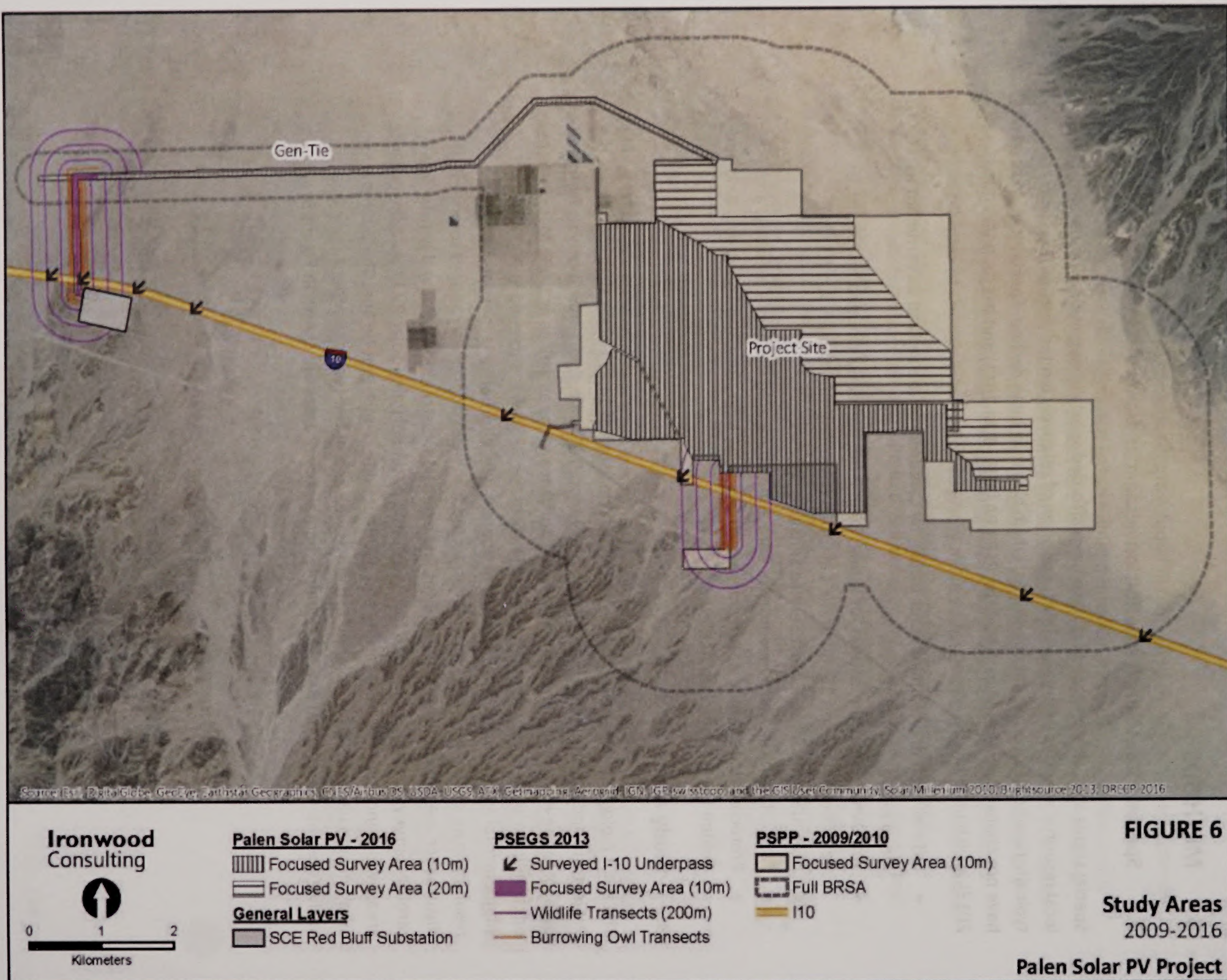
3.1 Special Status Species Definition

Special status species are those that have been afforded special recognition by federal, State, or local resource agencies or organizations, are often of relatively limited distribution, and typically require unique habitat conditions, which also may be in decline. Special status criteria have not changed since publication of the PSPP PA/FEIS (BLM 2011) and PSEGS DSEIS (BLM, 2013), which include:

- Officially listed, or candidate for listing, by California or the Federal Government as Endangered, Threatened, or Rare;
- Taxa which meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the California Environmental Quality Act (CEQA);
- BLM, USFWS, or U.S. Forest Service Sensitive Species;
- Taxa listed in the CNPS Inventory of Rare and Endangered Plants of California; and
- Protected under other statutes or regulations (e.g., Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, etc.).

3.2 Study Areas

The PSPP Biological Resources Study Area (BRSA) consisted of 14,771 acres that encompass the Project site and a surrounding buffer area (1,000-foot, 0.75-mile, and 1-mile intervals from and parallel to the edge of nonlinear portions of disturbance areas as well as at 1,000 feet from the edge of linear project components). The majority of the BRSA was surveyed in 2009, with supplemental surveys performed in 2010 to address new alternative layouts at the time resulting in an expanded BRSA. Surveys conducted for PSEGS addressed changes to proposed disturbance areas including the natural gas line extension, distribution yard, and gen-tie line reroute. Surveys performed in 2016 focused on the potential Palen Solar PV Project disturbance areas, which included the solar facility and 300-foot wide, 7-mile gen-tie line. The 2016 survey area encompasses the Palen Solar PV Project as well as a buffer (size dependent upon final facility design). The original BRSA and supplemental survey areas are shown in Figure 6.



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3.3 Wildlife Species

3.3.1 Agassiz's Desert Tortoise

Full coverage protocol desert tortoise surveys were conducted during the following periods:

- March 17 to May 22, 2009 (PSPP BRSA except substation)
- October 24 to 25, 2009 (PSPP substation and buffer)
- March 16 to May 16, 2010 (PSPP alternative disturbance areas and buffers)
- April 7 to April 29, 2013 (PSEGS modified linear facilities)
- April 30 to May 15, 2016 (Palen Solar PV Project)

The full coverage survey option described in the revised protocols (USFWS 2010a) was unchanged from the previous protocol (USFWS 1992). These surveys employed belt transects approximately 10 meters (32.8 feet) apart in order to provide 100 percent (full) coverage of the focused survey area (Figure 6; USFWS 2009). Surveys performed from 2009 to 2013 included additional transect-based sign surveys within the buffer zone at 1,000-foot, 0.75-mile, and 1-mile intervals from and parallel to the edge of nonlinear portions of disturbance areas as well as at 1,000 feet from the edge of linear portions of disturbance areas (e.g., gen-tie line) (Solar Millennium 2010a).

The Project site consists of two primary zones based on the soil conditions (see Sections 2.4 and 2.5) that correspond with potential habitat for certain species including desert tortoise. Previously documented distribution of desert tortoise sign, ammophilous special status plants, and Mojave fringe-toed lizard follow these zone boundaries with a slight degree of an intergrading ecotone. The eastern extent of the site is characterized by the presence of shallow sand sheets and dunes that support special status plants and Mojave fringe-toed lizard (Davis and Soong 2013). The eastern extent is mapped as "clearance survey area only" for desert tortoise and the western extent of the site is mapped as a "desert tortoise protocol survey area" per the DRECP (CEC 2014a, Figure H-6). The boundary of the DRECP desert tortoise survey zones correlate with the desert tortoise habitat modeled by Nussear et al. (2009) along the 0.4 model unit value, which is slightly more conservative than previous assessments that have used the threshold of 0.5 or greater as the predicted value that corresponds with suitable desert tortoise habitat (USFWS 2011 and 2012).

The 2016 desert tortoise surveys employed belt transects approximately 10 meters (32.8 feet) apart in order to provide 100 percent (full) coverage within 2,346 acres of the solar facility and within a 300-foot wide corridor along the 7-mile gen-tie line (USFWS 2009). Within 1,601 acres in the northern and eastern extent of the solar facility, surveys employed belt transects approximately 20 meters (65.6 feet) apart.

The survey crews during all desert tortoise surveys consisted of experienced desert tortoise surveyors. Surveys were conducted by slowly and systematically walking linear transects while surveyors visually search for desert tortoise and sign. Particular emphasis was placed on searching around the bases of shrubs and along the banks of shallow washes. All tortoise sign [e.g., live tortoises (all age classes), shell/bone/scutes, scats, burrows/pallets, tracks, egg shell fragments, and courtship rings] were recorded if present. The condition of sign was categorized per the following class designations (USFWS 2009):

1. currently active, with desert tortoise or recent desert tortoise sign;
2. good condition (no evidence of recent use) - definitely desert tortoise;
3. deteriorated condition (including collapsed burrows) - definitely desert tortoise;
4. good condition - possibly desert tortoise; and
5. deteriorated condition (including collapsed burrows) - possibly desert tortoise.

The location of all tortoise sign was recorded using a Global Positioning System (GPS) unit. In addition to recording sign with the GPS unit, standardized paper datasheets were completed. All data were digitally entered and used in GIS to determine approximate abundance and distribution of desert tortoise.

In August 2016, Ironwood biologists revisited fourteen desert tortoise burrows and twelve bone fragment locations that were previously identified during the 2009/2010 surveys. The GPS coordinates were used to navigate to the previously collected data points. The immediate area of each location was surveyed for any remaining sign, taking into consideration of potential variation in GPS accuracy.

3.3.2 Mojave Fringe-toed Lizard

Surveys for Mojave fringe-toed lizard were performed concurrently with desert tortoise transects in 2009, 2010, 2013, and 2016. As described in Section 3.3.1, suitable habitat for Mojave fringe-toed lizard is largely discrete from that of desert tortoise within the Project site apart from a narrow ecotone between the two. This distinction allowed for effective surveys for both species using belt transects during previous surveys. In 2016, surveys employed approximately 201 linear miles of belt transects averaging 20 meters (65.6 feet) apart within the eastern extent of the solar facility (within an area of 1,601 acres) and approximately 324 linear miles of belt transects averaging 10 meters (32.8 feet) apart within the western extent of the solar facility (within an area of 2,346 acres) and 300-foot wide corridor along the gen-tie line. The transects were walked systematically while surveyors visually searched for live Mojave fringe-toed lizards. All observations were noted in hardcopy datasheets. Location information was recorded using GPS. In areas of higher density of lizards sighting, groups of lizards were tallied and represented by a single data point.

3.3.3 Avian Species

The *Draft Bird and Bat Conservation Strategy (BBCS) for the Palen Solar Photovoltaic Project* (WEST 2016), which provides a thorough account of avian studies performed to date, has been summarized herein (Table 3). A suite of avian habitat assessments, focused surveys, and baseline sampling have been performed since 2009 to characterize existing and potential avian use of the Project site (WEST 2016). Beginning in 2009 in support of PSPP, focused surveys were performed for special status species and breeding season point count surveys were performed at 48 stations.

Initiating in 2013, extensive surveys and analysis were performed to evaluate avian risks related to the PSEGS technology including:

- Multi-season small bird count (SBC) surveys designed to provide a larger sample size than in in previous years;
- Multi-season bird use count (BUC) surveys to detect large birds over wider areas;
- Shorebird and waterfowl surveys at offsite agricultural ponds;
- Mist net surveys to detect species that may otherwise go undetected under other methods;
- Nocturnal radar surveys;
- Habitat evaluations for Elf Owl and Gila Woodpecker;
- Golden eagle nesting, winter, and prey abundance surveys; and
- Burrowing owl surveys.

Point counts were performed at a series of pre-determined points located along a survey route (EDAW and BBI 2009, BBI 2013a, BBI 2013b, Levenstein et al. 2014). Trained observers recorded all the birds seen and heard during a set period of time at each station. Point counts are effective for detecting small birds (visually or by their calls) located near the point location, but have limited effectiveness in detecting rare species, except as incidental observations. That said, point count data may be used to estimate avian species diversity, abundance, and richness, which can be filtered by season.

Bird use count (BUC) surveys were performed to primarily detect larger avian species, particularly raptors, which soar overhead and are visible from long distances (BBI 2013a, BBI 2013b; Levenstein et al. 2014). By design, BUCs consist of fewer sampling stations than the aforementioned point counts and are spaced more widely on the landscape with longer periods of observation time associated with each station.

Table 3 - Avian Studies Performed Since 2009

STUDY (TAXA)	PURPOSE	PROTOCOL	SURVEY AREA	SURVEY DATES
Bird Use Count (BUC) Surveys (medium large birds)	Estimate the spatial and temporal use of site by medium to large birds, particularly vultures and diurnal raptors	8 hrs/survey Point counts using 800-m (2,625-ft) radius circular plots (similar to those described by Reynolds et al. 1980, Bibby et al. 1992) 6 BUC observations points established throughout the PSEGS site and surrounding 0.6-mile (1.0-km) buffer	96 BUC surveys; 762 hrs	April 8– May 4, 2013
			24 BUC surveys; 192 hrs	May 5 – June 1, 2013
			414 BUC surveys; 3,234 hrs	August 20 – December 13, 2013
			2 stations; 666 hrs	March 24 – June 5, 2014
			2 stations; 785 hrs	March 9 – June 5, 2015
Small Bird Count (SBC) Surveys	Characterize use by migrant and resident birds, particularly songbirds, within the site and surrounding area during the spring and fall migration periods	10 min/survey Transects across solar facility footprint including 1-mile buffer	48 stations; 1,920 min; 6 transects	April 12 – May 8, 2009
			120 stations; 4,790 min; 14 transects	April 8 – May 4, 2013
			186 stations; 12,960 min; 14 transects	May 5 – June 29, 2013
			150 stations; 19,390 min; 14 transects	August 19 – November 14, 2013
			72 stations; 7,870 min; 14 transects	March 24 – June 5, 2014
			64 stations; 7,000 min; 14 transects	March 16 – June 5, 2014
Mist Net Surveys	Increase the probability of	12, 12x2.6m nets/survey	502.7 mist net hours	April 11 – May 4, 2013
			1,322.4 mist net hours	May 9 – June 14, 2013

STUDY (TAXA)	PURPOSE	PROTOCOL	SURVEY AREA	SURVEY DATES
	detecting inconspicuous birds that might otherwise go undetected		1,080 mist net hours	September 18 – October 30, 2013
Agricultural Pond Surveys (Shorebirds, Waterbirds, and Waterfowl)	Evaluate use of agricultural ponds adjacent to the northwest boundary of the site	3 stations 323 hours	Three agricultural ponds within the privately-owned land to the northwest of the site and just beyond the palm plantation	August 19 – December 10, 2013 March 27 – June 2, 2014 March 13 – June 3, 2015
Nocturnal Radar Surveys (migrants)	Document migration over the project area and to measure parameters of the migration	1, 3 km radius station 600 hours	PSEGs footprint and buffer	August 19 – October 31, 2013 March – June 2014
Gila woodpecker	Determine presence or absence of Gila Woodpecker	Concurrent with SBCs	Transects across solar facility footprint including 1-mile buffer 120 stations; 4,790 min	April 8 – May 4, 2013
			Transects across solar facility footprint including 1-mile buffer 186 stations; 12,960 min	May 5 – June 29, 2013
Elf Owl Surveys	Determine presence or absence of Elf Owl	143 callback stations 63 listening stations 10 – 14 min/station		May 18 – June 15, 2013
Habitat Evaluation for Elf Owl and Gila Woodpecker	Assess habitat suitability for Elf		29, 50-meter radius Habitat Suitability stations	July 2 – July 19, 2013

STUDY (TAXA)	PURPOSE	PROTOCOL	SURVEY AREA	SURVEY DATES
	Owl and Gila Woodpecker			
Winter Golden Eagle Surveys	Evaluate use of the site and surrounding region by wintering and resident golden eagles	Baited camera trapping (7 stations) and visual surveys	7 stations	January 23 – February 27, 2013
Golden Eagle Nest Surveys	Estimate number of territories within 10-mile buffer of project and determine if active nests occur.	Surveys by air and ground as per USFWS Guidelines (Pagel et al. 2010) All areas of suitable golden eagle nesting habitat and known eagle nest sites within the Palen Mountains and the Chuckwalla Mountains, including transmission structures along the Interstate 10 (I-10) power lines.	10-mile buffer Coxcomb Mountains Palen Mountains Chuckwalla Mountains, including transmission structures along the Interstate 10 (I-10) power lines	March 20 – April 15, 2013 Ground-based March 20, 21, and 22, 2013 in the Coxcomb Mountains Aerial April 6 and 7, 2013 Ground-based April 8 and April 15, 2013 in the Chuckwalla Mountains
			10-mile buffer Palen Mountains, and along a 20-mile (32-km) length of the DPV2, and Chuckwalla Mountains Coxcomb Mountains	May 24 – August 3, 2013 Aerial May 24 and 25, 2013 and August 2-3 Ground-based May 24 and 25, 2013, and June 9, 11, and 15, 2013.
			Same as above	April 8 to 12, July 1 to 3, 2014
			Same as above	March 10 to 19, 2015
Golden Eagle Prey Abundance Surveys	Obtain data on the presence and general abundance of rabbits on site.	Conducted as surveyors walked along transects between SBC	122 miles of transects between SBC points	April 9 to June 29, 2013

STUDY (TAXA)	PURPOSE	PROTOCOL	SURVEY AREA	SURVEY DATES
		survey points and recorded lagomorphs		
Burrowing Owl Surveys	Determine presence or absence of Burrowing Owl within the site.	per CBOC 1993 Protocol Guidelines and concurrent with desert tortoise survey	Throughout PSPP footprint and buffer	March 10 – June 14, 2009
		per CDFW 2012 Protocol Guidelines	Linear facilities only (gen-tie and gas line modifications)	April 7 – June 26, 2013

Mist nets were used to detect inconspicuous species that might have gone otherwise undetected during other surveys. This method uses fine-thread nets to capture birds for identification and release (BBI 2013a, BBI 2013b, Levenstein et al. 2014).

Nocturnal radar surveys were performed to provide estimates of the rate, intensity, flight altitudes, and timing of birds migrating through a given area (Levenstein and Nations 2013).

3.3.3.1 Western Burrowing Owl

The Project site is considered suitable habitat for western burrowing owl, with one exception being the northern end of the Project site that is densely covered in Sahara mustard (CEC 2010). Survey recommendations in both the 1993 CBOC Guidelines and 2012 CDFW Staff Report include baseline data collection and an assessment of site use. Surveys (consistent with Phase II of the CBOC 1993 Guidelines and the 2012 CDFW Staff Report) were conducted concurrently with surveys for desert tortoise and other fossorial species in 2009, 2010, 2013, and 2016 to provide details of burrowing owl occupancy and site use. Surveys included pedestrian transects spaced 10-to-20 meters apart, which provided a greater level of survey effort and coverage than the 30-meter spacing recommended in the 1993 Guidelines. The concurrent survey effort was successful in identifying all burrows that could support any special status species, including burrowing owl. Biologists were prompted to assess each burrow for burrowing owl sign when completing field datasheets. All sign, including the presence of individuals, feathers, tracks, white wash, pellets, and suitable burrows were recorded if present.

Occupancy of burrowing owl habitat is confirmed at a site when at least one burrowing owl, or its sign at or near a burrow entrance, is observed within the last three years (CDFW 2012; California Burrowing Owl Consortium 1993). Breeding season surveys (Phase III) were conducted in the project footprint and buffer during the peak of the 2009 breeding season and along linear facilities during the 2013 breeding seasons (CEC 2010; Karl 2013a).

In August 2016, Ironwood biologists revisited five locations of burrowing owl sign that were previously identified during the spring 2016 surveys. The GPS coordinates were used to navigate to the previously collected data points. Changes in the presence of burrowing owl sign were recorded.

3.3.3.2 Golden Eagle

<u>Nest Surveys</u>

Aerial and ground-based golden eagle nesting surveys were conducted in 2010, 2012, 2013, 2014 and 2015 following the *USFWS February 2010 Interim Golden Eagle Inventory and Monitoring Protocols* (Pagel et al. 2010). During surveys, all areas within the study area were

searched for large stick nests used by golden eagles, other raptors, and ravens on cliff faces and transmission towers.

Spring 2010 aerial surveys for golden eagles were conducted by Wildlife Research Institute (WRI) covering the area within a 10-mile radius from the PPSP boundaries as well as three other proposed solar projects (CEC 2010). The surveys covered eleven mountain ranges between and around Blythe and Desert Center (BBI 2013b, BBI 2013c, BBI 2013d).

In 2012, the BLM contracted BioResource Consultants Inc. to collect updated field data and report current breeding status of golden eagles within the BLM's California Desert District and Northern California District. The objective of this effort was to survey all of the mountain ranges containing known and potential golden eagle nesting habitat. Aerial surveys (167 flight hours) and/or ground-based surveys (30,205 miles) were performed in the vicinity of 350 previously documented nest sites using methodology consistent with currently accepted guidelines (Pagel et al. 2010). The first phase of the survey effort included documentation of occupancy and condition of known and newly discovered golden eagle nests. The second phase focused on determining the breeding status and reproductive output of active golden eagle nests.

Spring and summer 2013 aerial and ground-based golden eagle nesting surveys were conducted by Bloom Biological Inc. (BBI) covering all areas of suitable golden eagle nesting habitat and known eagle nest sites within the Palen Mountains, Coxcomb Mountains, and Chuckwalla Mountains, including transmission structures along the I-10 power lines (BBI 2013c). Due to bighorn sheep (*Ovis canadensis*) lambing season flight restrictions, aerial surveys in the Chuckwalla Mountains were conducted from heights of greater than 1,500 ft (457 m) in all areas. Follow-up ground-based surveys were conducted on foot in the Chuckwalla Mountains in April 2013, to visit and observe potential golden eagle nest sites identified during aerial surveys. Three additional days of foot and vehicular surveys were conducted in March 2013 in the Coxcomb Mountains, which could not be surveyed by helicopter at any reasonable height due to flight restrictions in Joshua Tree National Park. Summer ground surveys were conducted in the Coxcomb Mountains in May and June 2013.

Spring and summer aerial and ground golden eagle nesting surveys were repeated from April 8 to 12 and July 1 to 3, 2014 (WEST 2016). Aerial surveys were conducted on April 9 and July 1 to 3, 2014 within a 10-mile buffer of the boundary for the PSEGS project. Ground based surveys were also conducted during the entire April survey period, during which all previously documented eagle nests were visited, and observers scanned for suitable habitat for new nests. As in other seasons, aerial surveys were limited due to restrictions for big horn sheep lambing.

Spring ground-based golden eagle nesting surveys were conducted from March 10 to 19, 2015 to obtain the status of previously documented golden eagle nests within a 10-mile buffer of the

previously proposed project (WEST 2016). Aerial surveys were not performed during this time period due to flying restrictions as a result of desert bighorn sheep lambing activity.

<u>Winter Surveys</u>

Winter golden eagle surveys were conducted by BBI in January and February (BBI 2013e). The purpose of the surveys was to evaluate use of the Project site and surrounding region by wintering and resident golden eagles using a combination of baited camera traps and visual surveys (WEST 2016). Carcasses were placed as bait and infrared motion-activated cameras were used to capture all visiting predators and scavengers. Visual surveys for golden eagles and other avian predators were conducted at the location of each bait station and by driving all accessible roads and stopping at random locations and scanning the skyline and potential perch locations such as cliffs, rock outcroppings and trees with high powered binoculars and spotting scopes (WEST 2016).

<u>Prey Abundance Surveys</u>

Golden eagle prey abundance surveys were conducted concurrently with SBC surveys by BBI during the spring of 2013 (BBI 2013c). Prey abundance surveys were conducted as surveyors walked along transects between SBC survey points and recorded the number of lagomorphs [black-tailed jackrabbits (*Lepus californicus*) and desert cottontails (*Sylvilagus audubonii*)] detected incidentally since leaving the previous station (WEST 2016). Similar counts of lagomorphs were performed during the desert tortoise and other special status species transects walked in spring 2016.

3.3.4 Bat Species

A survey for bat roosts within the Project site and surrounding region (e.g., freeway underpasses, bridges, buildings) was conducted in 2009 and 2013 (WEST 2016). Potential bat roosts were surveyed within the Project site in 2016 during transect surveys. Emphasis was given to the desert dry wash woodland areas that support relatively larger vegetation (e.g., ironwood trees) that may support hollowed trunks.

Acoustic bat surveys were conducted in May 2013 and October through mid-December 2013 with the objective of assessing the potential for bat roosting and foraging habitat (WEST 2016). Passive acoustic monitors were stationed at 13 locations throughout the Project site, approximately 3 feet off the ground. The acoustic monitoring devices utilized in spring 2013 included two ranges of ultrasonic microphones to enhance the detection of species such as pallid bat (*Antrozous pallidus*), California leaf-nosed bat (*Macrotus californicus*), hoary bat (*Lasiurus cinereus*), western mastiff (*Eumops perotis*), and other larger free-tail bat calls (WEST 2016). The fall/winter acoustic survey consisted of ultrasonic detectors with standard microphones deployed at three of the stations previously surveyed in the spring and one

additional station located at a pond associated with the adjacent agricultural property. Acoustic data were analyzed and call sequences were visually examined.

3.3.5 Other Special Status Wildlife Species

Surveys were performed in spring 2016 over the Project site by systematically walking linear transects while surveyors visually searched for burrows and other sign of special status fossorial species. In addition to sign of desert tortoise and western burrowing owl, presence of desert kit fox (e.g., dens, complexes, scat, and tracks) and American badger were recorded.

During all biological resource surveys, biologists recorded all wildlife species, regardless of status, that were encountered during the survey. All special status species recorded incidentally during all survey efforts were recorded by GPS and assigned a unique identifier. Common species were tallied at the end of each transect and recorded throughout each day by each crew. All data was entered from these datasheets and was incorporated into GIS.

In August 2016, Ironwood biologists revisited twenty locations of desert kit fox and two locations of American badger that were previously identified during the 2009/2010 surveys. The GPS coordinates were used to navigate to the previously collected data points. The presence or absence of sign was recorded.

3.4 Special Status Plants

Focused special status plant surveys (CDFW 2016c) were conducted during the following periods:

- February to April 2009 (PSPP BRSA)
- Spring 2010 (PSPP alternative disturbance areas)
- October 11 to 15, 2010 (PSPP BRSA)
- March 30, 2013 (PSEGS modified linear facilities)
- April 30 to May 15, 2016 (Palen Solar PV Project)
- March 22 to April 6, 2017 (selected areas of Palen Solar PV Project)

Survey methodology followed the intuitive controlled survey approach (Whiteaker 1998) as described in Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species (BLM 2009) and consistent with the following guidance documents: (1) Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed, and Candidate Plants (USFWS 2000); (2) Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities (CDFG 2009); (3) CNPS Botanical Survey Guidelines (CNPS 2001); and (4) Survey Protocols for Survey and Manage Strategy 2:

Vascular Plants (Whiteaker 1998). CNPS List 3 and 4 may be considered regionally significant if, for example, the occurrence is located at the periphery of the species' range, or exhibits unusual morphology, or occurs in an unusual habitat/substrate (CDFG 2009). For these reasons, List 3 and 4 species were included in the literature search and targeted during field surveys.

Substantial rain events occurred in the Chuckwalla Valley in October 2010, which resulted in 0.72 inches (18 mm) of rain averaged between the Eagle Mt. and Blythe met stations. Surveys performed in October 2010 (AECOM 2010) targeted late-blooming special status plants including Abram's spurge (*Chamaesyce abramsiana*), flat-seeded spurge (*Chamaesyce platysperma*), glandular ditaxis (*Ditaxis claryana*), pink velvet mallow (*Horsfordia alata*), lobed ground cherry (*Physalis lobata*), California ditaxis (*Ditaxis serrata* var. *californica*), jackass clover (*Wislizenia refracta* ssp. *refracta*), and Palmer's jackass clover (*Wislizenia refracta* ssp. *palmeri*). Reference sites were visited prior to conducting focused surveys in fall 2010.

Surveys performed in spring 2016 included visual coverage across the entire Project site. Surveys employed belt transects approximately 10 meters apart in order to provide 100 percent coverage within 2,346 acres of the solar facility boundary and within a 300-foot wide corridor along the 7-mile gen-tie line (USFWS 2010c). Within 1,601 acres in the northern and eastern extent of the solar facility boundary, surveys employed belt transects approximately 20 meters apart. Transect spacing was adequate to detect the target species, if present. Plant surveys were performed with experienced lead botanists alongside the wildlife survey field crews. All surveyors were trained on diagnostic features, habitat notes, and location maps of targeted species. A cumulative list of all plant species observed during the surveys was maintained. Reference locations previously documented were revisited. The efficacy of 2016 plant surveys was limited due to the lack of preceding winter rainfall, and in an average rain year, the phenology of most desert annuals would be well past fruiting stage and drying-up by the time of the survey.

Rainfall during the 2016/2017 winter was above-average, which provided an opportunity to gain greater confidence in special status plant species occurrence. Additional surveys were performed in spring 2017 included a systematic survey of the following areas:

- 2,326 acres (corresponding with sandy soils within the solar facility study area);
- 227 acres (corresponding with sand sheets in Zone II and potential habitat for Harwood's eriastrum [*Eriastrum harwoodii*], if present); and
- 209 acres (associated with the gen-tie line).

Survey methods were consistent with accepted survey protocols (BLM 2009; USFWS 2000; CDFW 2009; CNPS 2001; and Whiteaker 1998). Nearby reference populations of target species including ribbed cryptantha (*Cryptantha costata*) and Harwood's eriastrum were visited to confirm germination and flowering status prior to conducting formal transects. Transects were

spaced 10m apart within the 227-acre Zone II and 209-acre gen-tie line survey areas. Transects within the remaining survey area were spaced no greater than 100m apart. Additional intuitive controlled transects were performed within portions of Zone III that supported suitable habitat for target species.

4 SPECIAL STATUS SPECIES DISCUSSION

4.1 Special Status Wildlife

Sixty-three special status wildlife species were reviewed for their potential to occur within the Project site and its vicinity based on regional plans and database records (Table 4 and Appendix A). The status of each species has been updated to reflect any recent changes. Several species were determined to have a low probability of occurrence due to the absence of suitable habitat and are discussed in Appendix A. Special status wildlife species that were detected within the Project site, buffer, or have the potential to occur based on the presence of suitable habitat within the Project site are discussed further in this section. A comprehensive list of wildlife species observed during previous surveys is included in Appendix B.

4.1.1 Agassiz's Desert Tortoise

<u>Background</u>

The desert tortoise was State-listed in California as threatened on August 3, 1989. The Mojave population was listed as threatened under FESA on April 2, 1990 (USFWS 1990), and critical habitat was designated on February 8, 1994 (USFWS 1994). The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, and southwestern Utah, and in the Sonoran (Colorado) Desert in California (USFWS 1990).

Desert tortoises are well adapted to living in a highly variable, and often harsh, desert environment (USFWS 2011). They spend much of their lives in burrows, even during their seasons of activity. In late winter or early spring, desert tortoises emerge from over-wintering burrows and typically remain active through fall. Activity does decrease in summer, is often crepuscular during the hottest times, and tortoises often emerge after summer rain storms. Activity and movement is generally influenced by temperature and precipitation, which correlate with potential food and water resources. Extreme temperatures, both high and low, and periods of drought typically result in reduced tortoise activity (Peterson, 1996). Mating occurs both during spring and fall. Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity [at approximately 180mm midline carapace length (MCL)]. Eggs are generally laid in friable soil near burrow entrances between April and June and occasionally September and October. Eggs hatch within three to four months (Rostal 1994).

Table 4 - Special Status Wildlife Species

Species	Status[1]			Potential to Occur on Project Site[2]
	State	Federal	WBWG	
REPTILES				
Agassiz's desert tortoise *Gopherus agassizii*	ST	FT	-	Low to Moderate
Mojave fringe-toed lizard *Uma scaparia*	SSC	BLMS	-	High
AMPHIBIANS				
Couch's spadefoot toad *Scaphiapus cauchii*	SSC	BLMS	-	Low
MAMMALS				
Colorado Valley woodrat *Neatama albigula venusta*	-	-	-	Low
Burro deer *Odacaileus hemianus eremicus*	CPGS	-	-	High
Desert bighorn sheep *Ovis canadensis nelsani*	CFP	BLMS	-	Low
Yuma mountain lion *Puma cancalar brawni*	SSC	-	-	Low to Moderate
American badger *Taxidea taxus*	SSC	-	-	High
Desert kit fox *Vulpes macratis arsipus*	CPF	-	-	High
BATS				
Pallid bat *Antrazaus pallidus*	SSC	BLMS	H	Foraging - Moderate Roosting - Low
Townsend's big-eared bat *Carynarhinus tawnsendii*	SSC	BLMS	H	Foraging - Moderate Roosting - Low
Big brown bat *Eptesicus fuscus*	-	-	L	Low
Spotted bat *Euderma maculatum*	SSC	BLMS	H	Low
Western mastiff bat *Eumaps peratis*	SSC	BLMS	H	Low
Hoary bat *Lasiurus cinereus*	-	-	M	Foraging - Moderate Roosting - Low
Western yellow bat *Lasiurus xanthinus*	SSC	-	H	Moderate
California leaf-nosed bat *Macratus califarnicus*	SSC	BLMS	H	Low
California myotis *Myotis califarnicus*	-	-	L	Foraging - Moderate Roosting - Low
Arizona myotis *Myatis accultus*	SSC	-	-	Low
Cave myotis *Myatis velifer*	SSC	BLMS	M	Low
Yuma myotis *Myatis yumanensis*	-	BLMS	LM	Low
Pocketed free-tailed bat *Nyctinamaps femarasaccus*	SSC	-	M	Low
Big free-tailed bat *Nyctinamaps macratis*	SSC	-	MH	Foraging - Moderate Roosting - Low

Species	Status[1]			Potential to Occur on Project Site[2]
Canyon bat *Parastrellus hesperus*	-	-	L	Foraging - Moderate Roosting - Low
Mexican free-tailed bat *Tadarida brasiliensis*	-	-	L	Foraging - Moderate Roosting - Low
Birds				
Golden eagle (Nesting and wintering) *Aquila chrysaetas*	CFP, WL	BCC, BLMS	-	Nesting/Wintering - Absent Foraging - Low
Short-eared owl (Nesting) *Asia flammeus*	SSC	-	-	Low
Western burrowing owl *Athene cunicularia hypugaea*	SSC	BCC, BLMS	-	High
Redhead (Nesting) *Aythya americana*	SSC	-	-	Low
Ferruginous hawk (Wintering) *Butea regalis*	WL	BCC	-	Moderate
Swainson's hawk *Butea swainsoni*	ST	BCC	-	Nesting - Low Migration - High
Costa's hummingbird (Nesting) *Calypte castae*	-	BCC	-	Moderate
Vaux's swift (Nesting) *Chaetura vauxi*	SSC	-	-	Nesting - Low Migration - High
Mountain plover (Wintering) *Charadrius mantanus*	SSC	BCC, BLMS	-	Nesting - Low Migration - Moderate
Black tern *Chlidanias niger*	SSC	-	-	Low
Northern harrier (Nesting) *Circus cyaneus*	SSC	-	-	Nesting - Low Wintering/Migration - High
Western yellow-billed cuckoo *Caccyzus americanus accidentalis*	SE	FT, BCC, BLMS	-	Low
Gilded flicker *Calaptes chrysaides*	SE	BCC, BLMS	-	Low
Black swift (Nesting) *Cypselaides niger*	SSC	BCC	-	Low
Willow flycatcher (Nesting) *Empidanax traillii*	SE	-	-	Low
Southwestern willow flycatcher *E. t. extimus*	SE	FE	-	Low
California horned lark *Eremaphila alpestris actia*	WL	-	-	High
Prairie falcon (Nesting) *Falca mexicanus*	WL	BCC	-	Nesting - Low Foraging - High
American peregrine falcon (Nesting) *Falca peregrinus anatum*	CFP	BCC	-	Nesting - Low Foraging - Moderate
Sandhill crane (Wintering) *Grus canadensis*	SSC	-	-	Nesting - Low Migration - Moderate
Yellow-breasted chat (Nesting) *Icteria virens*	SSC	-	-	Low
Loggerhead shrike (Nesting) *Lanius ludovicianus*	SSC	BCC	-	High
Gila woodpecker *Melanerpes urapygialis*	SE	BCC, BLMS	-	Low
Elf owl *Micrathene whitneyi*	SE	BCC, BLMS	-	Low

Species	Status[1]			Potential to Occur on Project Site[2]
Long-billed curlew (Nesting) *Numenius omericonus*	WL	BCC	-	Nesting - Low Migration - Moderate
Lucy's warbler (Nesting) *Oreothlypis lucioe*	SSC	BCC, BLMS	-	Moderate
American white pelican (Nesting colony) *Peleconus erythrorhynchos*	SSC	-	-	Nesting/Wintering - Low Migration - Moderate
Black-tailed gnatcatcher *Polioptila melonuro*	WL	-	-	High
Vesper sparrow *Pooecetes gromineus*	SSC	-	-	Low
Purple martin *Progne subis*	SSC	-	-	Low
Vermilion flycatcher (Nesting) *Pyrocephalus rubinus*	SSC	-	-	Low
Ridgway's clapper rail *Rallus obsoletus yumonensis*	ST, CFP	FE	-	Low
Bank swallow (Nesting) *Riporio riporia*	ST	BLMS	-	Nesting/Wintering - Low Migration - Moderate
Sonora Yellow warbler (Nesting) *Setophogo petechio sonorona*	SSC	BCC	-	Nesting - Low Migration - Moderate
Lawrence's goldfinch (Nesting) *Spinus lowrencei*	-	BCC	-	Low
Bendire's thrasher *Toxostomo bendirei*	SSC	BCC, BLMS	-	Low
Crissal thrasher *Toxostomo crissale*	SSC	-	-	Low
Le Conte's thrasher *Toxostomo lecontei*	SSC	-	-	High
Arizono Bell's vireo *Vireo bellii arizonoe*	SE	BCC, BLMS	-	Low
Leost Bell's vireo *V. b. pusillus*	SE	FE		
Yellow-headed blackbird (Nesting) *Xonthocephalus xonthocepholus*	SSC	-	-	Low

[1] Status

Federal FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range

FT = Federally listed, threatened: species likely to become endangered within the foreseeable future

FCT = Proposed for federal listing as a threatened species

BCC = Fish and Wildlife Service: Birds of Conservation Concern:

State SSC = State Species of Special Concern

CFP = California Fully Protected

SE = State listed as endangered

ST = State listed as threatened

WL = State watch list

CPF = California Protected Furbearing Mammal

CPGS = California Protected Game Species

Bureau of Land Management

BLMS = BLM Sensitive

Western Bat Working Group (WBWG)

H = are imperiled or are at high risk of imperilment

M = warrant closer evaluation, more research, and conservation actions

L = most of the existing data support stable populations

[2] Species not detected during previous surveys may have the potential to occur on the Project site in the future.

Desert tortoises inhabit a variety of habitats from flats and slopes dominated by creosote-white bursage communities, where a diversity of perennial plants is relatively high, to a variety of habitats in higher elevations. Tortoises are found most often on gentle slopes with sandy-gravel soils. Soils must be appropriately soft for digging burrows, but firm enough so that burrows do not collapse (Anderson et al., 2000). Tortoises typically prefer habitats with abundant annual forbs, grasses and cactus, which constitute its primary food sources. Current research has suggested that plant species that have high potential for potassium excretion (high-PEP) may be critical to the diet of desert tortoise (Oftedal 2002; Oftedal et. al 2002). Excess potassium can be detrimental to the health tortoises. When excreting potassium salts from their bladder, tortoises risk expelling valuable water and protein in the process.

Desert tortoises occupy home ranges, which are generally defined as the area traversed while carrying out a range of normal activities (e.g., foraging and mating) (USFWS 2011). The size of desert tortoise home ranges can vary with respect to sex, geographic location, substrate, topography, and year depending on climate factors such as rainfall and temperature. Tortoises are philopatric, establishing home ranges between 15 and 45 hectares (Barrett 1990, O'Connor et al., 1994, Harless et al. 2009) depending on region. Home ranges of females are generally smaller than those of males (Duda et al. 1999). Some tortoises have been known to travel great distances, although these movements may occur outside their usual home range (Berry 1986).

The Project is located within the Colorado Desert Recovery Unit. The highest desert tortoise densities within this recovery unit (Murphy et al. 2007) occur in Chemehuevi and Ward valleys (approximately 60 miles north of the project site), on the Chuckwalla Bench within the Chuckwalla Desert Wildlife Management Area (DWMA), and in Joshua Tree National Park (approximately 40 miles northwest of the project site).

Project Surveys

The Project site supports desert tortoise habitat with low predicted occupancy values, not accounting for habitat degradation resulting from existing anthropogenic features (Nussear et al. 2009). The Project site consists of two primary zones based on the soil conditions that correspond with suitable habitat for desert tortoise. The eastern extent of the site is characterized by the presence of shallow sand sheets and dunes that support ammophilous species and correlates with a predicted occupancy value (Nussear et al. 2009) of less than 0.4 (Figure 7). This value falls below the 0.5 threshold that has been used in previous assessments as corresponding with suitable desert tortoise habitat (USFWS 2011 and 2012).

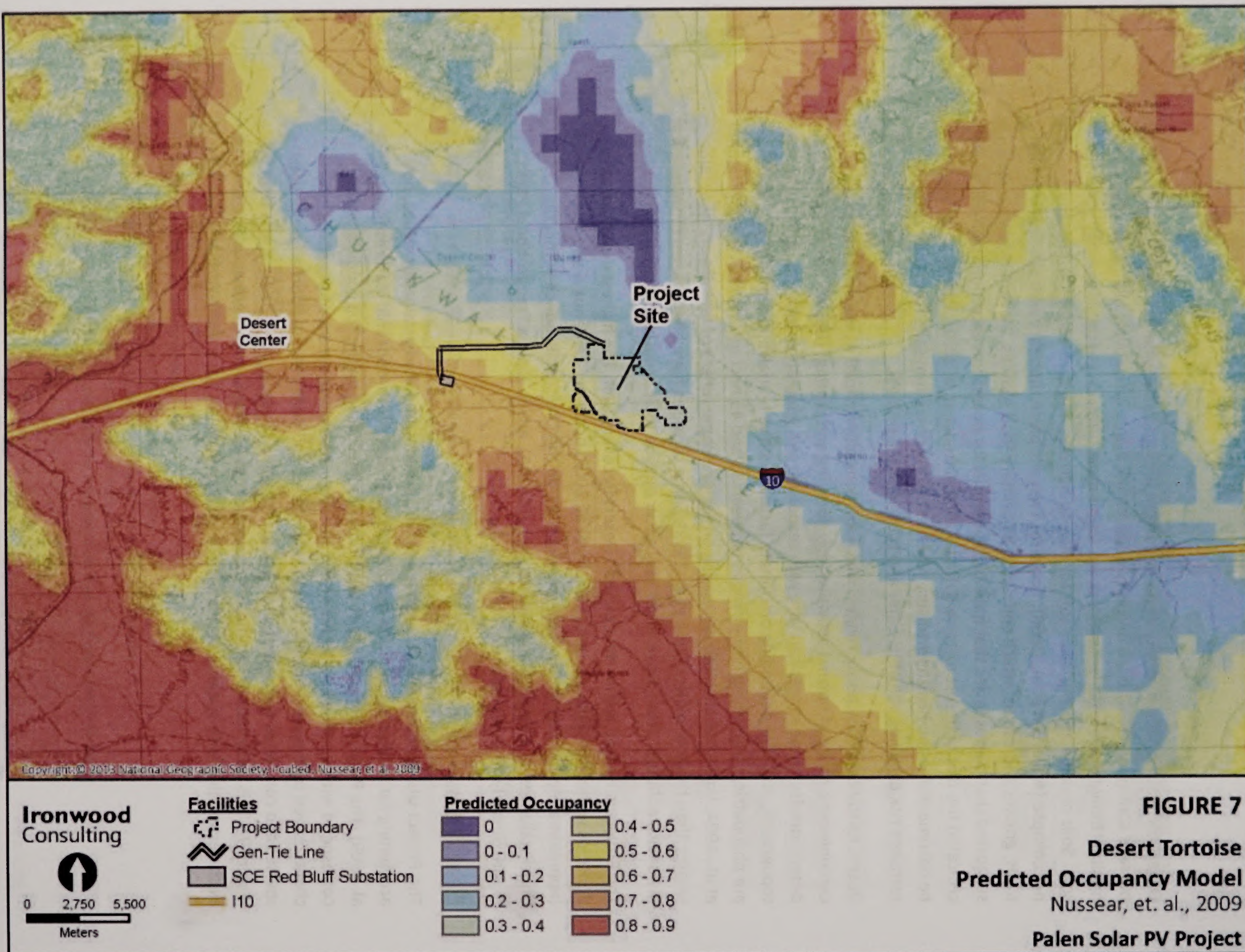

FIGURE 7

Desert Tortoise

Predicted Occupancy Model

Nussear, et. al., 2009

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Prior surveys resulted in no live desert tortoises, seventeen burrows (Class 3–5), fifteen pallets (Class 4 or 5), and nineteen tortoise shell remains (Class 5) within the solar facility boundary of the Project site (Figure 8; CEC 2010). As described in Section 3.3.1, Class 4 and 5 sign is defined as not active and possibly, but not definitely, attributable to desert tortoise. Class 5 sign is in deteriorated condition. Active and recent tortoise use was not evident during the most recent surveys performed in spring of 2016, which identified no live desert tortoises, no active sign, and no deteriorated sign within the Project site. In August 2016 during the re-visitation of desert tortoise sign that was previously identified in 2009/2010, none of the previously identified burrows remained and only two locations of disarticulated bone fragments remained.

The portion of the Chuckwalla Critical Habitat Unit that overlaps the Project site did not exhibit notably higher quality tortoise habitat compared to elsewhere within the Project site.

Habitats with higher predicted occupancy values (Nussear et al. 2009) and documented sign of recent tortoise activity are associated with the western two miles of the gen-tie line. The 2009 surveys identified four live desert tortoises along the gen-tie line, three within the buffer and one within the proposed disturbance area. During spring 2013 surveys, two recent burrows were found within buffer zones along the gen-tie line reroute and one north of I-10 (Karl 2013a). During the 2016 surveys, active tortoise sign (one active burrow with tracks and scat and two records of scat) was found along the gen-tie line near the previous observations. Habitats with higher predicted occupancy values (Nussear et al. 2009) are found south of I-10 corresponding with higher elevation alluvial fan plant communities. Seven live tortoises (adult and juvenile) were found within the buffer surveys south of I-10 in 2010.

The lower amount of detectable sign found in 2016 versus in prior years within the solar facility boundary may be a result of several factors including natural erosion from wind and rain coupled with the low dispersal onto the site. Flood events have been documented occurring in the region since 2010. Such events may have washed away or buried the small amount of historical disarticulated shell remains. Alluvial processes would also be expected to transport similar sign onto the site from habitat upslope as surface flow is directed across the majority of the site from the southwest where the predicted occupancy values (Nussear et al. 2009) is relatively higher within the alluvial fans; however, there are existing anthropogenic features and private land uses that likely buffer the site from the adjacent habitat.

The agricultural properties adjacent to the solar facility's western and northern boundary include a large-scale date palm farm. The farm supports a modern irrigation system and up to two large, open reservoirs. Since its development prior to 2009, the farm has likely subsidized wildlife that has been known to prey on desert tortoises, including canids and ravens.

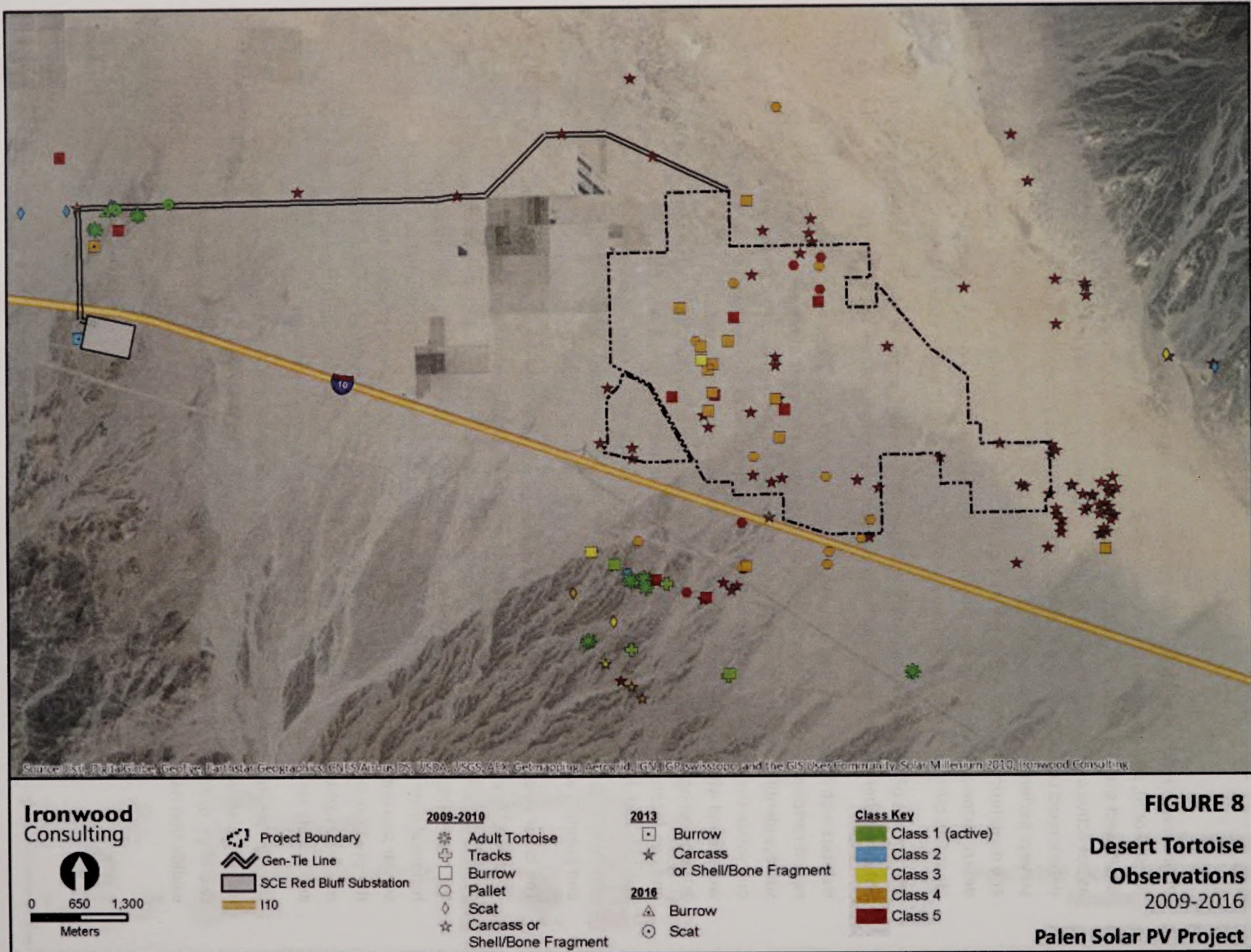

FIGURE 8

Desert Tortoise Observations

2009-2016

Palen Solar PV Project

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During the 2016 surveys, a substantial coyote presence was documented near the existing farm and throughout the Project site. An abundant amount of coyote tracks and scat were documented during the surveys. The majority of coyote scat contained palm fruit seeds. One active coyote den was located within the Project site. Three pups from this season were observed. Free-roaming domestic dogs were also observed during the surveys of the Project site in the vicinity of the agricultural land. The increased presence of coyotes over the last several years may have negatively affected the local population of desert tortoises.

Connectivity

The population structure of desert tortoise is characterized as isolation-by-distance, resulting in a genetic gradient across the Mojave Desert that is consistent with a continuous-distribution model of gene flow (USFWS 2011). Habitat connectivity for desert tortoise has become the subject of increased focus due to the unique demographic and genetic characteristics of the species. There remain challenges in creating an interconnected reserve that adequately links CHUs, or Tortoise Conservation Areas (TCAs), to meet the conservation metrics outlined in the Population Viability Assessment (PVA) of the 1994 Recovery Plan (USFWS 1994). The existing reserve for the Mojave population of desert tortoise may be limited due to its size and shape not meeting the recommendations in the PVA; therefore, the importance of preserving adequate linkages outside the periphery of the reserve has been emphasized (Averill-Murray et. al 2013). Identifying and evaluating the threat of barriers to gene flow on population viability is a critical factor in recovery (USFWS 2011). Preservation should aim at maintaining linkages that demonstrate that they are large enough for resident tortoises to persist within the linkage and continue to interact with tortoises within and outside the linkage.

On a regional scale, the Project site is situated outside priority habitat and linkages (Figure 9; CEC 2015). The layers associated with these features were developed from least cost pathway with the highest relative potential to support desert tortoises based on the predicted occupancy model (Nussear et al. 2009). Within the NECO plan area, the identified linkages are consistent with the least cost paths modeled by Hagerty et al. (2011). The predicted occupancy model (Nussear et al. 2009) and the resulting regional tortoise habitat linkage areas indicate that the site is located within an area of low predicted occupancy and outside modeled linkage areas. As previously noted, the Project site overlaps the Chuckwalla CHU, which is included in the TCA reserve. While the tortoise habitat within this portion of overlap may appear marginal, it may be important as dispersal habitat, especially in the desert dry wash woodlands. The value is also somewhat impaired with regard to local-scale connectivity due to the I-10 corridor located to the south of the Project site (Figure 10).

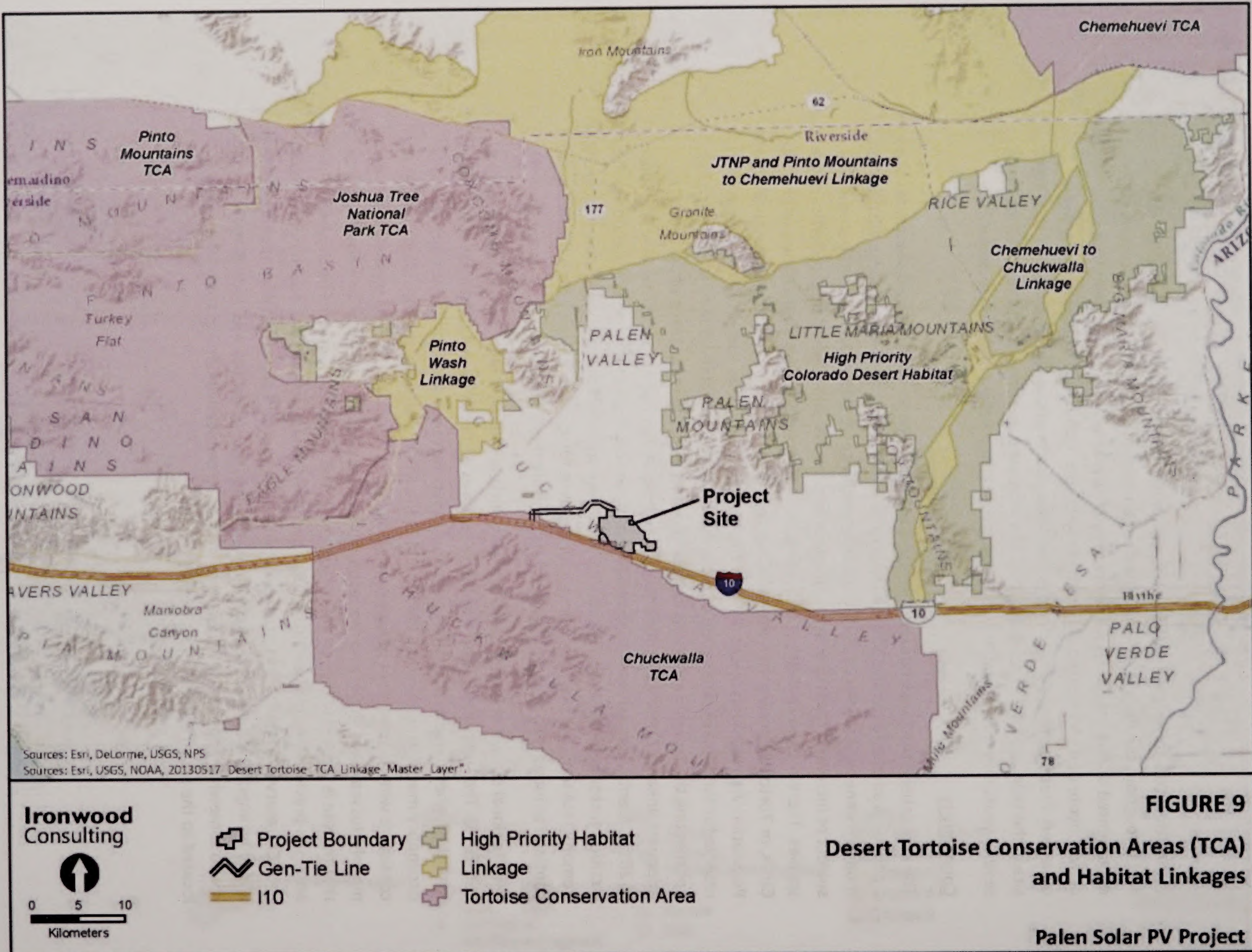

FIGURE 9

Desert Tortoise Conservation Areas (TCA) and Habitat Linkages

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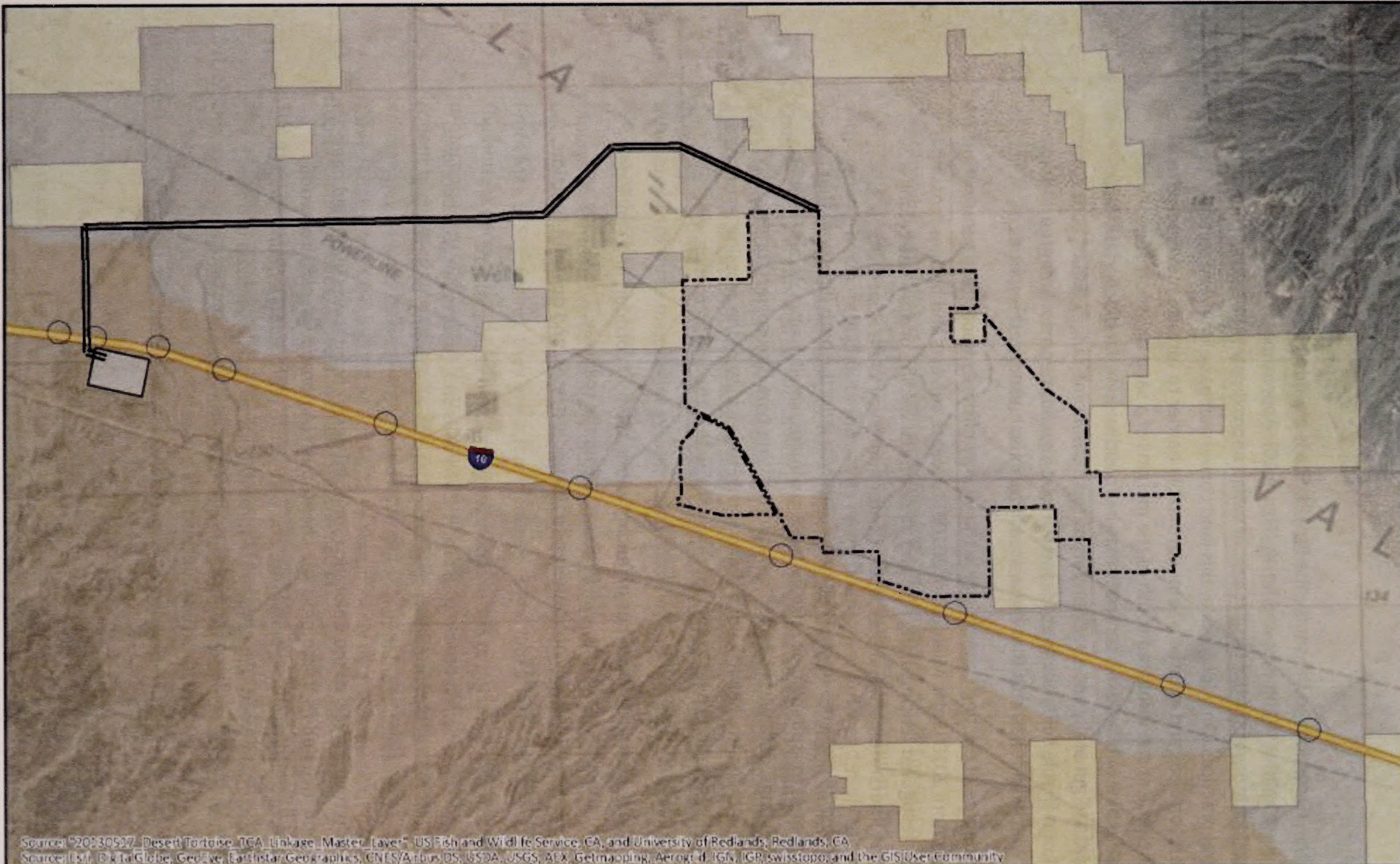

Ironwood Consulting

0 650 1,300
Meters

Project Boundary
Gen-Tie Line
SCE Red Bluff Substation
I10
2013 PSEGS I-10 Underpass Survey Areas
Private Land Ownership
Tortoise Conservation Area

FIGURE 10

Local Desert Tortoise Connectivity

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In addition to the I-10 corridor to the south, the Project site is bounded by private land to the west and sand dune habitat to the east and north (Figure 10). Approximately 1,600 acres of private lands are located west of the Project site, of which approximately 830 acres support active agricultural practices. On a local scale, this land conversion has eliminated suitable habitat for desert tortoises and created a semi-permeable barrier to tortoise movement from west-to-east. The Project site is located south of the margins of a sand transport zone, and south of Palen Dry Lake. While desert tortoises may be found in dunes and desert dry lake areas, these areas are generally not a regular part of tortoises' home ranges due to poor cover, low forage, and non-friable soils; however, desert tortoise sign has been documented within these habitats, which demonstrates that these areas are, in fact, used by the species.

To evaluate the degree of existing connectivity in the vicinity of the Project site, a survey effort was conducted in April 2010 (Solar Millennium 2010b) to locate culverts and bridges crossing I-10. This survey investigated fencing along I-10 and all potential wildlife underpasses along a 32-mile stretch of the interstate between the Desert Center and Wiley Wells Road exits.

This survey identified 24 crossings (oriented approximately in a north-south direction) that were further evaluated for suitability for use by large mammals, small mammals, and reptiles. For each of the crossings, data was collected on undercrossing type (box culvert, bridge, etc.) and dimensions (length, width, height), animal sign within the vicinity of the crossing, estimated degree of perennial vegetation cover at the approach and within the undercrossing, where criteria ranged from Bare-to-Dense (60 – 85% cover).

The survey additionally identified two types of fencing within the I-10 corridor, and concluded the fencing does not function to restrict wildlife access across the roadway. The fencing was often missing or in disrepair, and was not tethered to the underpasses, and does not function to funnel wildlife under the interstate.

Wildlife species and/or sign detected at the undercrossings included lizards, rodent (*Peromyscus* sp., *Dipodomys* sp., *Neotoma* sp.), rabbit (*Sylvilagus* sp.), roadrunner (*Geococcyx californianus*), ground squirrel (*Spermophilus* sp.), fox, coyote (*Canis latrans*), bobcat (*Lynx rufus*) and mule deer (*Odocoileus hemionus*).

Perennial vegetation type, typical of the Colorado (Sonoran) desert habitat was identified near the underpasses, and included *Psorothamnus* sp., cheesebush (*Ambrosia salsola*), ironwood (*Olneya tesota*), mesquite (*Prosopsis glandulosa*), and palo verde (*Cercidium floridum*), brickell bush (*Brickellia* sp.) scorpion weed (*Phacelia* sp.), *Psorothamnus* sp., cattle saltbush (*Atriplex polycarpa*), brittlebush (*Encelia farinosa*), white bursage (*Ambrosia dumosa*), creosote (*Larrea tridentata*).

It was concluded the underpasses provide connectivity and safe movement corridors between the habitat to the north and south of the I-10 interstate, and that current fencing does not prevent animals from accessing I-10, or funnel animals to the underpasses (Solar Millennium 2010b).

Summary

The PSPP PA/FEIS (Section 3.23) asserted that PSPP disturbance area consisted of lower predicted desert tortoise habitat north of I-10 and moderate habitat south of I-10, which is consistent with the current conditions of the Project. The potential for desert tortoises to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.2 Mojave Fringe-Toed Lizard

The Mojave fringe-toed lizard (*Uma scoparia*) is a California Species of Special Concern. The Mojave fringe-toed lizard is found in arid, sandy, sparsely vegetated habitats and is associated with creosote scrub throughout much of its range (Jennings and Hayes 1994). This species is restricted to aeolian sand habitats in the deserts of Los Angeles, Riverside, and San Bernardino Counties in California and La Paz County in Arizona (Hollingsworth and Beaman 1999; Stebbins 1985; Murphy et al. 2006). Within these regions, they are known to occur at more than 35 sand dune complexes in California and one in Arizona (Jarvis 2009). Nearly all records for this species are associated with present-day and historical drainages and associated sand dune complexes associated with three major river systems with blow sand: Amargosa River, Mojave River, and Mojave and Colorado Rivers (BLM 2015).

Mojave fringe-toed lizards normally hibernate from November to February, emerging from hibernation sites from March to April. The breeding season is April to July (Mayhew 1965). From May to September, they are active in mornings and late afternoon, but seek cover during the hottest parts of the day. It burrows in the sand for both cover from predators and protection from undesirable temperatures (Stebbins 2003), though it also will seek shelter in rodent burrows. Home ranges for Mojave fringe-toed lizards vary greatly between sexes with adult males typically holding large (0.10 hectare or 0.3 acre) home ranges that are on average three times that of females (BLM 2015). They are primarily insectivorous, but also eat plant food including leaves, seeds and buds (Stebbins 2003).

The assessment of the sand transport system (see Section 2.5) associated with the Project site and adjacent lands have assisted in characterizing suitable Mojave fringe-toed lizard habitat. As this species requires loose, wind-blown sand, its distribution within the survey areas is consistent with the presence of suitable soil conditions. The distribution of Mojave fringe-toed lizards resulting from the 2016 surveys was largely consistent with previously described suitable

habitat, which primarily included all stabilized and partially stabilized sand dunes and also included contiguous wash habitat that supported appropriate soils (CEC 2010).

Wildlife surveys conducted in 2009 and 2010 identified highest concentrations within Zone II outside of the Project site (Figure 11). Zone II is characterized by vegetated active sand dunes (Kenney 2010). While the majority of Zone II occurs outside the Project site, approximately 6 percent of the Project site is located within Zone II. Within the Project site, surveys conducted in 2009, 2010, and 2016 had consistent results in that Zone II supported the highest density of observations compared to other portions of the Project site. In 2016, 34 observations were recorded within 228 acres within Zone II. In 2009 and 2010, a total of 66 observations were recorded within Zone II.

Approximately 23 percent (903 acres) of the Project site is located within Zone III. In 2016, 114 observations of Mojave fringe-toed lizards were recorded within Zone III and 65 observations in Zone IV (2,776 acres). In 2009 and 2010, a total of 26 observations were recorded within Zone III and 2 observations were recorded in Zone IV. Although a higher number of Mojave fringe-toed lizard observations were recorded in 2016 within Zone III and Zone IV than in previous years, they were located within habitat that was previously identified as suitable for this species (BLM 2011).

The variation in recorded observations between previous surveys and 2016 data may be most attributed to differences in survey timing, resulting in differences in temperature at time of surveys, and volume of existing data at the time of surveys. In spring 2009 when the majority of the PSPP site was surveyed, surveys began in mid-March when temperatures are often lower than optimal for Mojave fringe-toed lizards. Jones and Lovich (2009) noted that this species was most active starting in late spring, during the hotter periods of the day when temperatures reach optimum levels (greater than 99 degrees Fahrenheit), and were rarely active when air temperatures were less than optimum. In 2016, surveys occurred later in the spring season, commencing in late April and the survey effort was refined to survey suitable habitat for Mojave fringe-toed lizard when daily temperatures were high, increasing the likelihood for detection of Mojave fringe-toed lizards.

Additionally, each subsequent survey can be more focused and refined based on the information collected and analyzed during previous efforts, as well as considering new datasets and models that broaden the understanding of habitat suitability for target species. The surveys in 2009 were the first focused field effort at the site and Mojave fringe-toed lizard observations were largely incidental to those of other species. The 2016 surveys were performed with an enhanced understanding of species' potential occurrence due to previous records and newly available data sources including the desert tortoise probability of occurrence model (Nussear et al. 2010) and the DRECP species suitability models for both Mojave fringe-toed lizard and desert tortoise, which were not available in 2009.

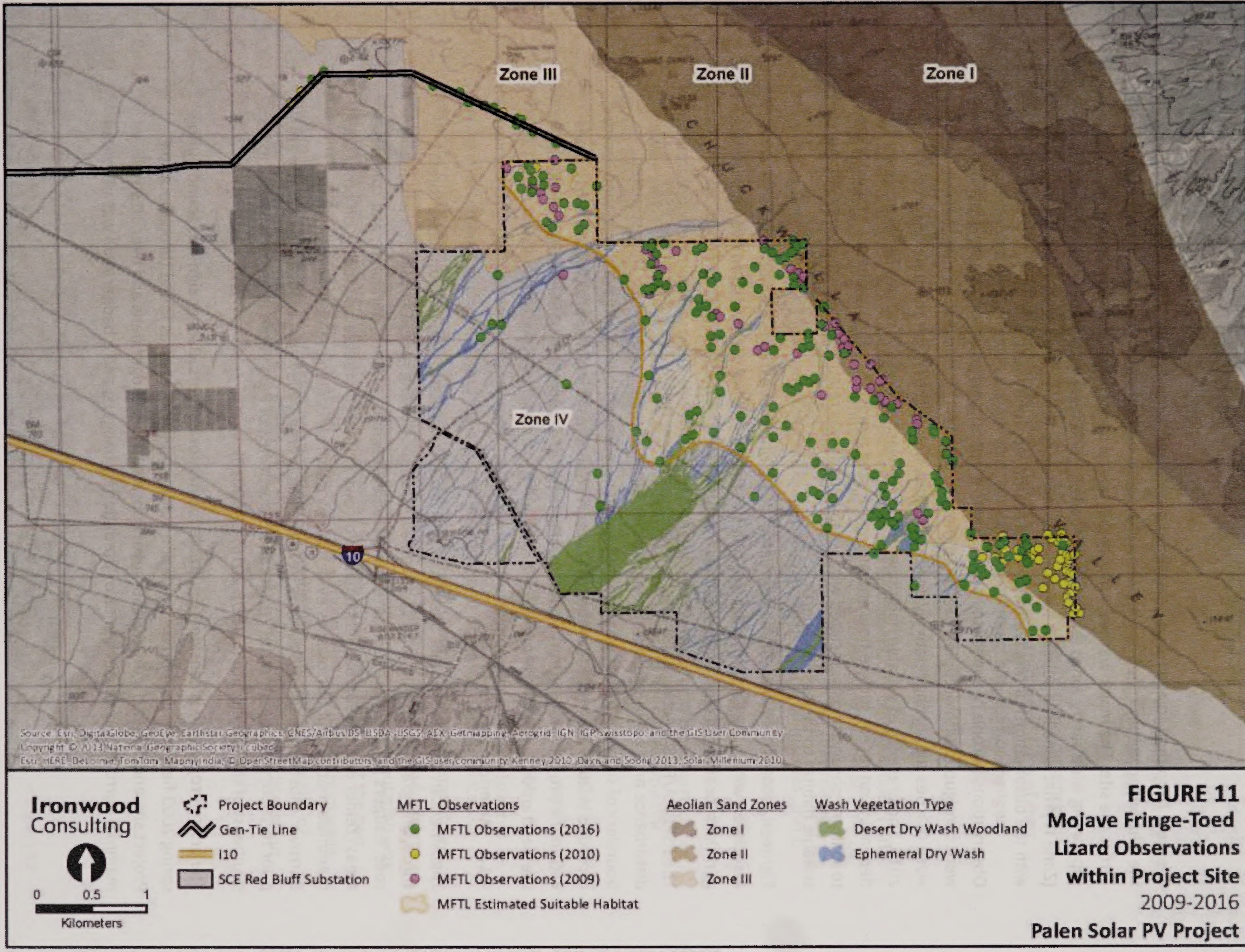

FIGURE 11
Mojave Fringe-Toed Lizard Observations within Project Site
2009-2016
Palen Solar PV Project

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Separate from the Mojave fringe-toed lizard studies performed in 2010, PWA (2010) described the alluvial fan within Zones III and IV and characterized both minor and major wash systems across the site. The major washes, notably the central major wash, were described as supporting wide sandy zones (at times as broad as 1,500 feet) within one mile of Interstate 10 (Zone IV) that appeared suitable for Mojave fringe-toed lizards. This description is consistent with the observations of Mojave fringe-toed lizards recorded in 2016.

Observations in Zone IV appear to correlate with mapped washes, as previously described, that were contiguous with occupied habitat to the east (Figure 11). This may be due to the lower wash reaches supporting relatively unconsolidated, fine sediments at the time of surveys in 2016. The presence of suitable habitat within these washes likely fluctuates between years depending on recent surface flow and adequate sand deposition. The number of Mojave fringe-toed lizard observations associated with wash habitat was relatively lower than areas of more suitable habitat to the east and north.

Eighteen records (five in 2010 and thirteen in 2016) of Mojave fringe-toed lizards were associated within the eastern-most two miles of the gen-tie line. The western five miles of the gen-tie is located outside suitable habitat for this species.

The PSPP PA/FEIS (Section 3.23) asserted that nearly one-half (1,781 acres) of the PSPP disturbance area contained suitable habitat for Mojave fringe-toed lizards. The estimated boundary of suitable habitat was updated based on observations of Mojave fringe-toed lizards recorded in 2016 (95 percent of the total observations) resulting in approximately 1,622 acres within the Project site (Figure 11). The total acreage of estimated suitable habitat is consistent the description in the PSPP PA/FEIS.

4.1.3 American Badger

The American badger is a State Species of Special Concern associated with dry open forest, shrub, and grassland communities with an adequate burrowing rodent population and friable soils. Badgers generally are associated with treeless regions, prairies, parklands, and cold desert areas (Zeiner et al. 1990). Badgers inhabit burrows and often predate and forage on other small mammals that inhabit burrows, as evidenced by claw marks along the edges of existing burrows. Most of the CNDDB records from the Palo Verde Valley area of Riverside County are prior to 1960; the closest to the Project site is northwest of Palo Verde approximately 12 miles southeast of the project site (CNDDB 2016; CEC 2010).

The entire Project site is considered suitable habitat for badgers. Badger sign was found during spring 2009 field surveys; burrow predation evidence by badgers was found throughout the Project site and buffer (Figure 12). Surveyors observed five badger dens and over 10 small mammal burrows showing evidence of predation by badgers, and a badger skull was observed

within the buffer, south of I-10. No badgers were observed during 2013 surveys of the modified linear components. The 2016 surveys noted one den with indication of badger use near the western boundary of the solar facility.

The PSPP PA/FEIS (Section 3.23) asserted that the entire PSPP disturbance area contained suitable habitat for American badger, which is consistent with the current conditions of the Project. The potential for American badger to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.4 Desert Kit Fox

Desert kit fox (*Vulpes macrotis arsipus*) is protected by the California Code of Regulations (Title 14, CCR: §460) and Fish and Game Commission Section 4000 as a fur-bearing mammal. Title 14 of the California Code of Regulations, Section 460, stipulates that desert kit fox may not be taken at any time. Desert kit foxes are fossorial mammals that occur in arid open areas, shrub grassland, and desert ecosystems within the Mojave Desert. Desert kit fox typically occur in association with their prey base, which includes small rodents, primarily kangaroo rats, rabbits, lizards, insects, and in some cases, immature desert tortoises (Zeiner et al. 1990). Dens that support multiple entrances provide shelter, escape, cover, and reproduction, but desert kit fox may utilize single burrows for temporary shelter. Litters of one to seven young are typically born in February through April (McGrew 1979).

In 2011, the first known cases of canine distemper virus (CDV) were observed in desert kit foxes about 20 miles west of Blythe on public lands managed by the BLM for the Genesis Solar Energy Project. CDV is transmitted by contact with body fluids containing the virus, and can be transmitted among multiple carnivore species. The outbreak was thought to have originated from an infected host animal entering the site, possibly a wild or domestic dog, American badger, or other carnivore. Desert kit foxes were captured for disease testing at several project sites within the region (including Desert Sunlight, Genesis Ford Dry Lake, SCE's Colorado River Substation, and PSPP) due to a concern that the spread of CDV within the kit fox population was facilitated by project-related displacement of infected animals. CDV was identified at the two latter sites, which span a distance of about 40 miles on the I-10 corridor within the Chuckwalla Valley (BLM 2010). The CDFW Wildlife Investigations Lab continues to monitor the health of desert kit foxes and is attempting to characterize the spread and significance of the disease on regional kit fox populations.

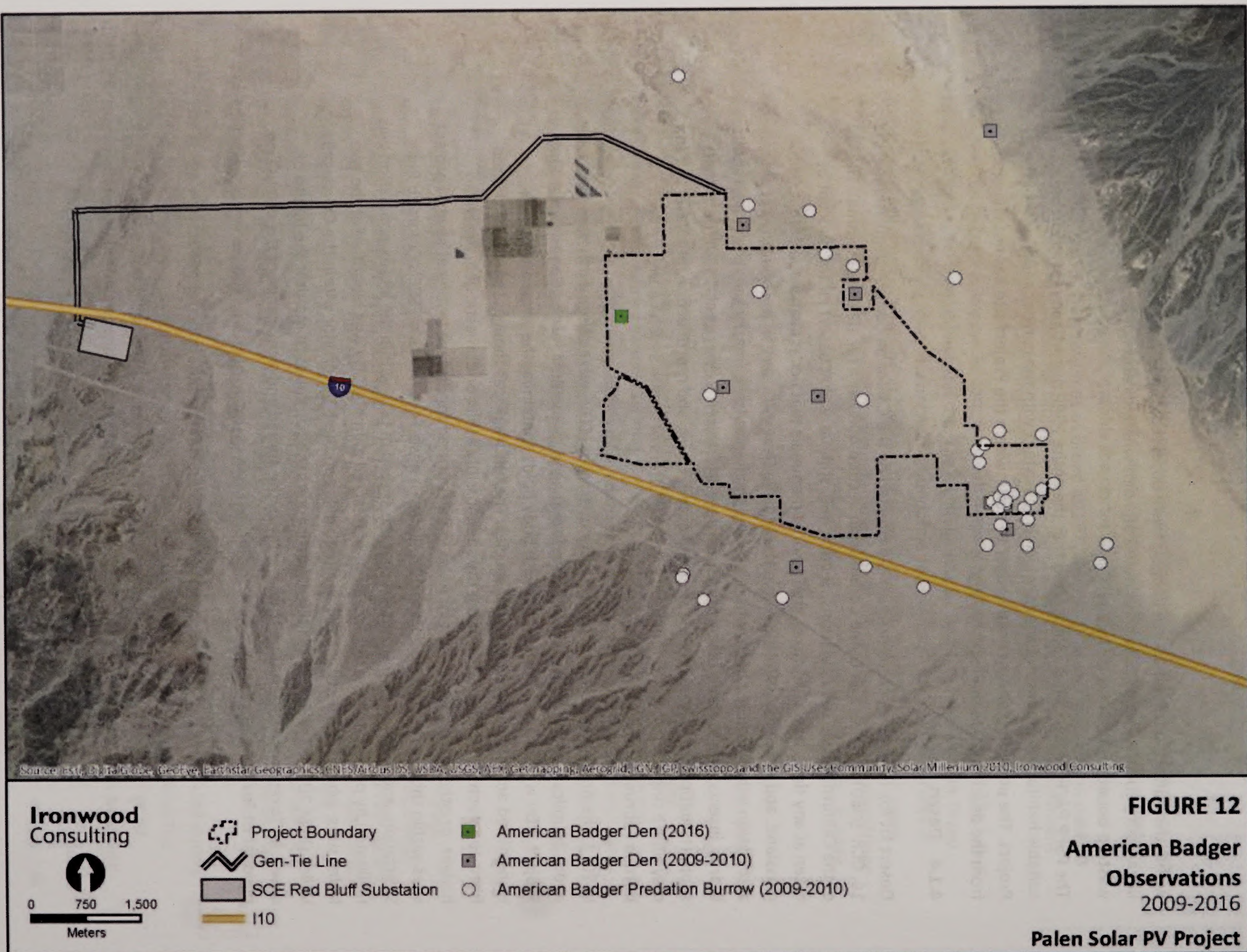

FIGURE 12

American Badger Observations

2009-2016

Palen Solar PV Project

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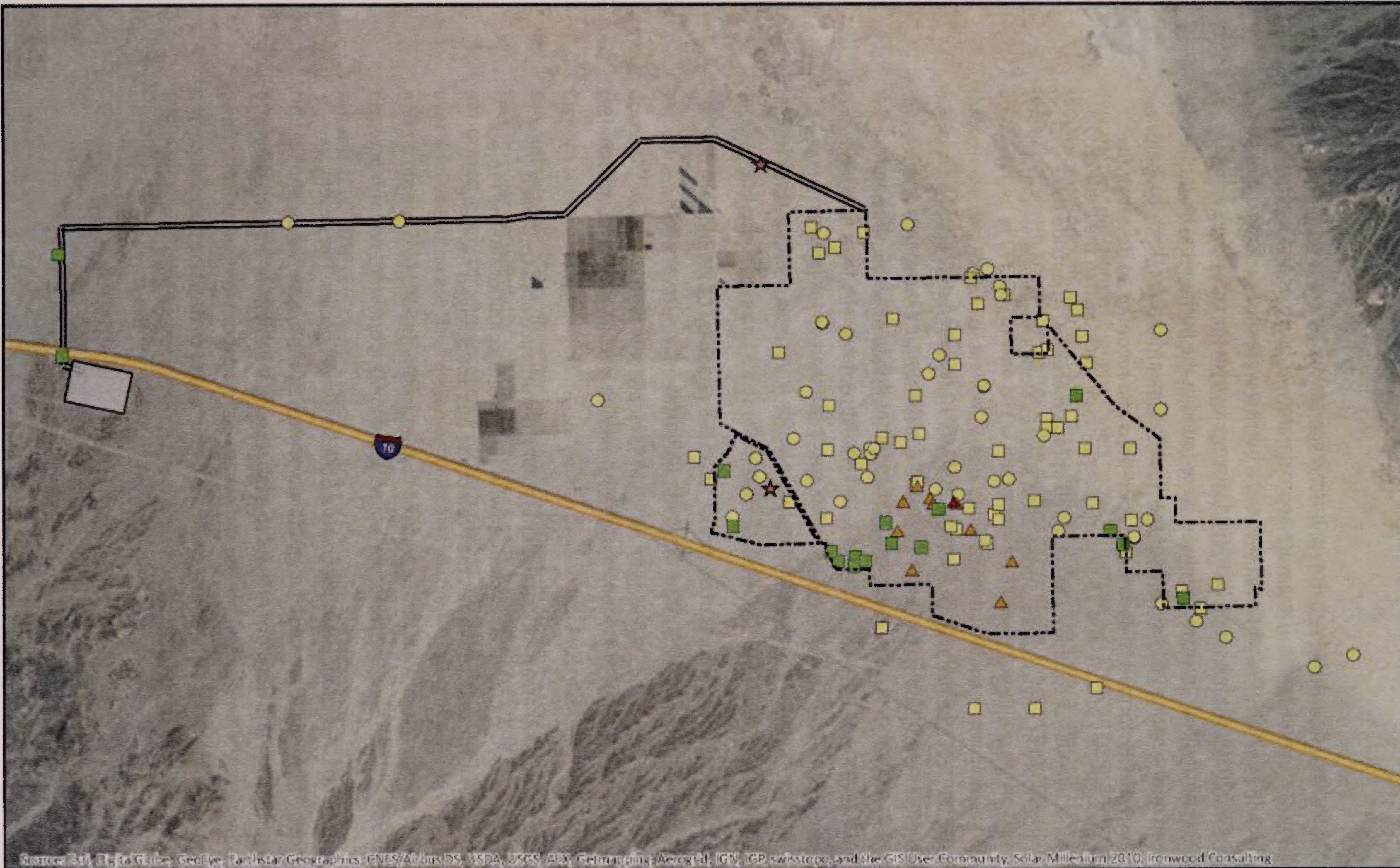

FIGURE 13

Desert Kit Fox Observations

2009-2016

Palen Solar PV Project

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During spring 2009 surveys, desert kit fox burrows, burrow complexes, and scat were observed throughout the Project site and buffer. There were approximately 71 burrows and burrow complexes recorded. In fall 2009, Desert kit fox scat and a burrow were observed along the gen-tie line (Figure 13; CEC 2010). During spring 2010 field surveys, two kit fox complexes were found in the Project site and four burrow complexes were found in the buffer area. No kit fox dens were observed during spring 2013 surveys of the modified linear features (Karl, 2013a). Spring 2016 surveys were performed to update site conditions and recorded 14 desert kit fox burrows/complexes, 20 pieces of scat, and 18 sets of desert kit fox tracks within the Project site. One additional active kit fox complex was recorded approximately 30 m outside the southeast Project boundary in August 2016. Spring 2016 surveys along the gen-tie yielded 4 desert kit fox burrows, 3 scat, and 3 tracks.

The reduction in the number of observations from the 2009/2010 recorded data could be a result of changing conditions on the Project site. Desert kit fox distribution is dynamic and would be expected to change over time under natural conditions due to available prey and other environmental factors. As noted in Section 4.1.1, the existing date palm farm may have subsidized the local coyote population allowing it to flourish more than under natural conditions. The presence of coyotes could dissuade desert kit fox from their previous recorded activity areas. Coyotes are known to prey on young kit fox pups.

Recent trapping and radio tracking efforts of desert kit fox in the region by CDFW indicate that foxes were using the region below I-10 and the Southern California Edison Devers-Palo Verde #2 (DPV2) transmission corridor and utilizing the Project site (Magdelena Rodriguez, CDFW, pers. comm.). During this program, seven dens that exhibit varying level of activity have been documented within the Project site.

The PSPP PA/FEIS (Section 3.23) asserted that the entire PSPP disturbance area contained suitable habitat for desert kit fox, which is consistent with the current conditions of the Project. The potential for desert kit fox to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.5 Desert Bighorn Sheep

The Desert Bighorn Sheep (*Ovis canadensis nelsoni)* is a BLM Sensitive Species. The desert bighorn sheep is found from the Transverse Ranges through most of the desert mountain ranges of California, Nevada, and northern Arizona to Utah. Essential habitat for bighorn sheep includes steep, rocky slopes of Desert Mountains, and areas where surface water is available for foraging. In the spring, when annual plants are available, bighorn tend to disperse downhill to bajadas and alluvial fans to forage (CEC 2010).

Over the past 140 years, bighorn sheep have suffered considerable population declines throughout their range. One contributing factor to this is that meta-populations have been fragmented by roads and other barriers, with a resulting decline in genetic diversity (Bleich et al., 1996, Epps et al., 2005). Disease (possibly resulting from contact with domestic sheep) drought, predation, anthropogenic factors, and loss of surface water sources may contribute to the viability of existing sheep populations (Wehausen 2005).

Two metapopulations of bighorn sheep occur within the NECO planning area, the Southern Mojave and Sonoran. Within these metapopulations, there are smaller, isolated subpopulations of bighorn sheep known as demes. Nine demes occur in the Sonoran metapopulation (BLM CDD 2002 as cited in CEC 2010). The NECO Plan addresses the conservation of the bighorn sheep through the designation of Bighorn Sheep Wildlife Habitat Management Areas (WHMAs), which overlay the entire range of their occurrence and movement corridors (CEC 2010). Bighorn sheep metapopulations have been fragmented by highways, roads, railroads, and aqueducts. The I-10 and Interstate 40 represent major obstacles to bighorn sheep movements. Transportation corridors associated with Highways 66, 62, 177, 95, and 78, the AT&SF Railroad (parallel to Old Highway 66) and the Eagle Mountain Railroad (proposed for reactivation) inhibit bighorn sheep movements between demes. Nevertheless, bighorn sheep are known to successfully cross these and other linear features such as transmission lines and fences (CEC 2010).

The project site is located south of occupied bighorn sheep WHMAs in the Palen, Granite, and Coxcomb Mountains (CEC 2010). Recent surveys suggest that bighorn sheep may occur in the Little Maria Mountains, further to the northeast of the Project site (Wehausen, 2009). Desert bighorn sheep have been documented in the Chuckwalla Mountains southwest of the project site and the Palen, Granite, Coxcomb, and Eagle mountain ranges to the north, west, and east. Six rams were observed in the Coxcomb Mountains during Phase 2 golden eagle surveys performed jointly for various energy projects during 2010 (CEC 2010). The Project site is located over 3 miles southwest from suitable mountainous habitat in the Palen Mountains and over 4 miles from suitable habitat in the Chuckwalla Mountains (CEC 2014a). Bighorn sheep may disperse through these mountain ranges typically whenever forage and water conditions are suitable (CEC 2010).

No sign or evidence of desert bighorn sheep were found during field surveys; however, scat is often difficult to distinguish from burro deer. While the Project site supports possible intermountain habitat for desert bighorn sheep, the 7-mile wide potential linkage situated between suitable bighorn sheep mountainous habitat supports a low-intactness value near the I-10 due to restricted movement opportunities associated with the freeway (CEC 2014a).

The PSPP PA/FEIS (Section 3.23) asserted that the entire PSPP disturbance area did not support evidence of desert bighorn sheep and does not occur within a known movement corridor, which is consistent with the current condition of the Project. The potential for desert bighorn sheep to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.6 Burro Deer

Burro deer (*Odocoileus hemionus eremicus*) is a subspecies of mule deer (*Odocoileus hemionus*) that inhabits desert dry wash woodland communities in the Colorado region of the Sonoran Desert near the Colorado River. Some burro deer are resident along the Colorado River, while others are transient and move into desert areas in response to seasonal increases in water and forage. During hot summers burro deer concentrate along the Colorado River or the Coachella Canal where water developments have been installed and where microphyll woodland is dense and provides good forage and cover. With late summer thundershowers and cooler temperatures, burro deer move away from the Colorado River and Coachella Canal into larger washes or wash complexes in the foothills and nearby mountains (BLM CDD 2002).

During 2009 field surveys, burro deer scat and tracks were observed in rocky substrate and deep washes including the western, central, and eastern desert washes that transect the project site. Deer sign was found within the washes and 150-foot-wide box culverts that convey the washes underneath I-10 (CEC 2010). Burro deer are also known to use a culvert associated with the western-most Project site wash to access a water source at the adjacent agricultural property (CEC 2010). The full Project site supports suitable habitat for burro deer. Surveys conducted in 2013 found burro deer scat and tracks in washes east of the proposed gen-tie alignment and adjacent to I-10, and tracks were observed in the natural gas line extension buffer zone proposed for PSEGS (Karl, 2013a). Surveys conducted in spring 2016 found scat and tracks throughout the Project site.

The PSPP PA/FEIS (Section 3.23) asserted that the entire PSPP disturbance area contained suitable habitat for burro deer and sign of burro deer was detected within the larger washes within the study area, which is consistent with the current conditions of the Project. The potential for burro deer to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.7 Bats

Bat roosts are known to occur in the vicinity of the Project site in the McCoy Mountains, Eagles Nest Mine (Little Maria Mountains), and Paymaster Mine located within 16km of the Project site (Larry LaPre, BLM, pers. comm.; CEC 2010). During roost surveys performed in 2009 and 2013, one roost site was recorded under the I-10 bridge across Corn Springs Road and no other

bat roosts were identified (WEST 2016). Bridges surveyed in the Project vicinity tended to be smooth cement and provided minimal to negligible roosting habitat (Pat Brown, pers. comm.). No active bat roosts were documented on the Project site; however, roosting opportunities for several bat species (e.g., canyon bat and California myotis) are available in tree cavities, soil crevices and rock outcroppings primarily within dry desert wash woodland habitats (CEC 2010). Surveys performed in 2016 noted many large ironwood trees that had the potential to serve as roost sites; however, no sign of bats were detected. It is not expected that any special status bat species would have a substantial roost on the Project site because habitat features most associated with these species (e.g. rock ledges, cliffs, large tree hollows, mine shafts) do not occur on site. The possibility exists for incidental observations for these species.

Several common and special status bat species were detected during acoustic monitoring and likely utilize habitats within the Project site for foraging especially when water is present within the desert washes and insects are more abundant (Table 5; CEC 2010; WEST 2016; Brown and Rainey 2013). Seven species of bats were detected during the spring and fall 2013 acoustic surveys. Seven additional species have the potential to occur on the Project site (Table 5). Two bat species (California leaf-nosed bat and Townsend's big-eared bat) typically have low intensity echolocation signals and may not have been acoustically detectable. Several call sequences were associated with either hoary or pocketed free-tailed bats; however, the calls lacked features for confirmation of species (WEST 2016).

Table 5 - Bat Species

COMMON NAME	SCIENTIFIC NAME	STATUS[1] (FEDERAL/STATE/WBWG)	DOCUMENTED PRESENCE[2]
High Frequency (> 40 kHz)			
California myotis	*Myotis californicus*	- / - /L	Detected during acoustic surveys
California leaf-nosed bat	*Macrotus californicus*	BLMS/SSC/H	Not detected
canyon bat	*Parastrellus hesperus*	- / - /L	Detected during acoustic surveys
cave myotis	*Myotis velifer*	BLMS/SSC/M	Not detected
Yuma myotis	*Myotis yumanensis*	BLMS/- /L	Not detected
Mid Frequency (30 - 40 kHz)			
western yellow bat	*Lasiurus xanthinus*	- /SSC/H	Detected during acoustic surveys
Low Frequency (< 30 kHz)			
big brown bat	*Eptesicus fuscus*	-/- /L	Not detected
big free-tailed bat	*Nyctinomops macrotis*	-/SSC/M	Detected during acoustic surveys
hoary bat	*Lasiurus cinereus*	-/- /L	Possibly detected during acoustic surveys

COMMON NAME	SCIENTIFIC NAME	STATUS[1] (FEDERAL/STATE/WBWG)	DOCUMENTED PRESENCE[2]
Mexican free-tailed bat	*Tadarida brasiliensis*	-/-/L	Detected during acoustic surveys
pallid bat	*Antrozous pallidus*	BLMS/SSC/L	Detected during acoustic surveys
pocketed free-tailed bat	*Nyctinomops femorosaccus*	-/SSC/M	Possibly detected during acoustic surveys
Townsend's big-eared bat	*Corynorhinus townsendii*	BLMS/SSC/H	Not detected
Very Low Frequency (< 15 kHz)			
western mastiff bat	*Eumops perotis*	BLMS/SSC/M	Detected during acoustic surveys

[1]Status

BLMS = Bureau of Land Management Sensitive Species (BLM 2010b)
SSC = CDFW Species of Special Concern (CDFW 2016)
WBWG = Western Bat Working Group (WBWG 2016)
H = are imperiled or are at high risk of imperilment
M = warrant closer evaluation, more research, and conservation actions
L = most of the existing data support stable populations

[2] Species not detected during previous surveys may have the potential to occur on the Project site in the future. Some bat species (e.g., Townsend's big-eared bat) are difficult to detect with acoustic surveys.

In spring 2013, a total of 989 identified bat call minutes were recorded for the four nights across the 12 detector locations (WEST 2016). The highest number of call minutes (443) was recorded at the site located in the northernmost station located next to a large palo verde tree. Canyon bats were the most common species detected at all stations, followed closely by California myotis (WEST 2016). Pallid and Mexican free-tailed bats were detected less frequently and not detected at all stations (WEST 2016). In fall 2013, the highest number of call minutes and species were recorded at the artificial pond located in the agricultural land outside the northwestern boundary of the Project site (WEST 2016).

4.1.7.1 Special Status Bats

Seven special status bat species that may forage on or near the Project site and were detected or possibly detected during acoustic surveys in 2013; therefore, are discussed further below. Suitable, but limited, roosting habitat may occur for several of these species within the dry wash woodland habitat on the Project site. Other special status bat species known from the region typically inhabit rocky sites and would not be expected to use the Project site for roosting.

Two special status species (e.g., cave myotis and Yuma myotis) were described in the PSPP PA/FEIS (Section 3.23) as having the potential to occur in the PSPP disturbance area; however, these species were not detected during acoustic surveys in 2013. The potential for these species to occur within the Project site has not changed from, and are likely less than, the description in the PSPP PA/FEIS.

Townsend's Big-Eared Bat

Townsend's big-eared bat (*Corynorhinus townsendii*) is a CDFW Species of Special Concern, BLM Sensitive Species, and was a recent candidate for state listing prior to CDFW recommending that listing was not warranted in a status review it prepared for the Fish and Game Commission in June 2016 (CDFW 2016b). This species roosts in caves, mines, abandoned dwellings, and large basal hollows of large trees (e.g., redwoods). Townsend's big-eared bat has been recorded occurring from sea level to approximately 9,000 feet elevation within a range of various habitats. This species typically forages along streams and within woodlands habitats.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable foraging habitat, but lacked suitable roosting habitat, for Townsend's big-eared bat. Townsend's big-eared bat was not detected during acoustic surveys in 2013 and this species typically has low intensity echolocation signals thus may not have been acoustically detectable (WEST 2016). Townsend's big-eared bat may forage within the Project site but it is not expected to roost due to absence of suitable structures (e.g., abandoned buildings) and natural features (e.g., caves and large hollowed trees). The potential for Townsend's big-eared bat to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

California Leaf-Nosed Bat

California leaf-nosed bat (*Macrotus californicus*) is a CDFW Species of Special Concern and BLM Sensitive Species. This species occurs in the deserts of California, southern Nevada, Arizona and south to northwestern Mexico. In California, they are currently known from eastern San Bernardino, Riverside, and San Diego counties and all of Imperial County (CEC 2012). California leaf-nosed bat relies on caves and mines for roosting habitat. Foraging habitat typically consists of riparian and desert wash habitats.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable habitat for California leaf-nosed bat. California leaf-nosed bat was not detected during acoustic surveys in 2013 and this species typically has low intensity echolocation signals thus may not have been acoustically detectable (WEST 2016). This species may forage within the Project site but it is not expected to roost due to absence of suitable caves and mines. The potential for California leaf-nosed bat to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

Pallid Bat

The pallid bat (*Antrozous pallidus*) is a CDFW Species of Special Concern and BLM Sensitive Species. It is a locally common species throughout California, and a year-round resident in most of the range. This species occupies a wide variety of habitats at elevations less than 6,000 feet including grasslands, shrublands, woodlands, and forests, and is most common in open, dry habitats with rocky areas for roosting; pallid bat roosts in cliffs, caves, crevices, mines, hollow trees, and various human-made structures (Zeiner 1990).

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable foraging and roosting habitat for the pallid bat. The pallid bat was detected during acoustic surveys in 2013 (WEST 2016). This species may forage and roost, primarily within the dry wash woodland, within the Project site. The potential for pallid bat to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

Western Mastiff Bat

The western mastiff bat (*Eumops perotis californicus;* greater bonneted bat) is a CDFW Species of Special Concern and BLM Sensitive Species. This species is widespread through the southwest U.S. and into Mexico. Its distribution in California is widespread, with year-round occurrence data primarily in central and southern California (Zeiner 1990). The western mastiff bat is found in a range of habitats, including coastal, forests, woodland, and desert scrub areas that are associated with roosting sites (Pierson and Rainey 1998). Roosting habitat typically consists of rocky crevices in canyons and cliffs with vertical or nearly vertical walls. The majority of roost sites are at least two meters above the ground (e.g., on cliff faces) and lacking obstructions.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable foraging habitat for the western mastiff bat, but that suitable roosting habitat for this species was absent. The western mastiff bat was detected during acoustic surveys in 2013, but relatively less frequently than other species (WEST 2016). The potential for western mastiff bat to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

Western Yellow Bat

The western yellow bat (*Lasiurus xanthinus*) is a CDFW Species of Special Concern. It is found in Arizona, New Mexico, Mexico, and year-round in California. It is found in arid regions, in riparian, desert riparian, desert wash and palm oasis habitat. The western yellow bat is insectivorous, and roosts and feeds in palm oases and riparian habitats (Zeiner 1990).

The PSPP PA/FEIS (Section 3.23) did not address the western yellow bat. This species was detected during acoustic surveys in 2013, but only at the artificial pond located near the date

palm farm outside the northwestern boundary of the Project site (WEST 2016). The Project site lacks typical foraging and roosting habitat for western yellow bat; however, this species may be found on the Project site due to the proximity of the existing offsite date palm farm.

Big Free-Tailed Bat

The big free-tailed bat (*Nyctinomops macrotis*) is a CDFW Species of Special Concern. Its distribution is south west U.S., and northern South America, generally from sea level to 8,000 feet in elevation. It is rare in California, prefers rocky terrain, and roosts in tree cavities and man-made structures. It is known to wander in autumn, out of its normal range (Zeiner 1990).

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable foraging and roosting habitat for the big free-tailed bat. This species was detected during acoustic surveys in 2013, but with the lowest detection rate of all species (WEST 2016). The big free-tailed bat may forage and roost, primarily within the dry wash woodland, within the Project site. The potential for this species to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

Pocketed Free-Tailed Bat

The pocketed free-tailed bat (*Nyctinomops femorosaccus*) is a CDFW Species of Special Concern. This species occurs but is less common in western North America, from southern California, central Arizona, southern New Mexico, western Texas, and more common in Mexico (WBWG 2016). The pocketed free-tailed bat has been documented in Riverside, San Diego, and Imperial counties. Typical habitats include pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis and roosting habitat typically includes rock crevices associated with granite boulders, cliffs, or rocky canyons at a height suitable for approach and takeoff (CNDDB 2016). Pocketed free-tailed bats are known to occur in the desert from March through August, when they then migrate out of the area (BLM 2011).

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable foraging and roosting habitat for the pocketed free-tailed bat. This species was possibly detected during acoustic surveys in 2013; several call sequences were associated with either hoary or pocketed free-tailed bats and lacked features for confirmation of species (WEST 2016). The potential for pocketed free-tailed bat to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.8 Western Burrowing Owl

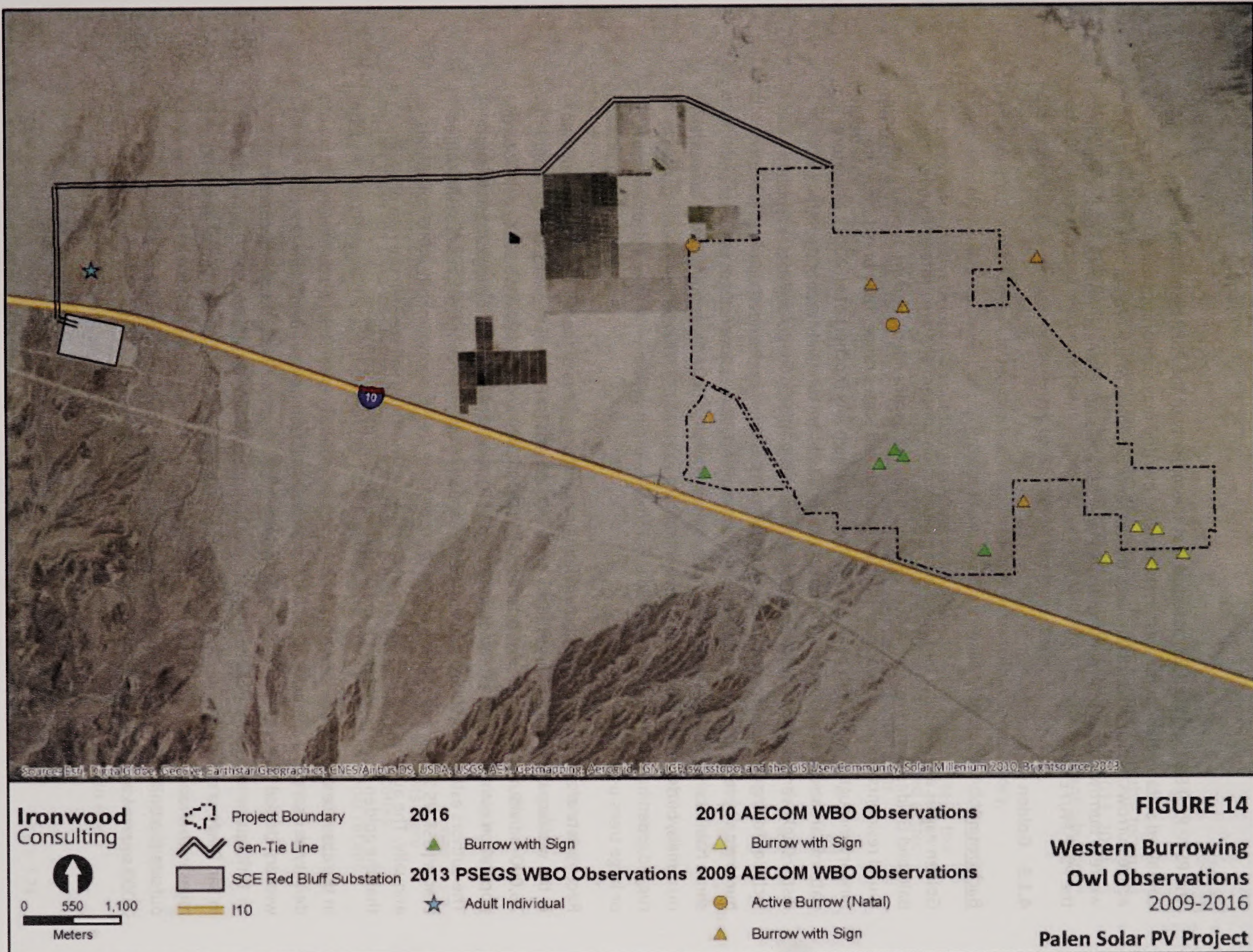
The Western burrowing owl *(Athene cunicularia hypugaea)* is a California Species of Special Concern, and a Federal Bird of Conservation Concern. Western burrowing owls inhabit arid lands throughout much of the western United States and southern interior of western Canada (Haug et al. 1993). Suitable habitat for western burrowing owl includes open habitat with available burrowing opportunities, including agricultural fields (active and fallow), creosote scrub, desert saltbush, ephemeral washes, and ruderal areas.

Burrowing owls are unique among the North American owls in that they nest and roost in abandoned burrows, especially those created by ground squirrels, kit fox, desert tortoise, and other wildlife. Burrowing owls have a strong affinity for previously occupied nesting and wintering habitats and will often return to previously-used burrows, particularly if they had successful reproduction in previous years (Gervais et al. 2008). The southern California breeding season (defined as from pair bonding to fledging) generally occurs from February to August, with peak breeding activity from April through July (Haug et al. 1993).

In the Colorado Desert, burrowing owls generally occur at low densities in scattered populations, but they can be found in much higher densities near agricultural lands where rodent and insect prey tend to be more abundant (Gervais et al. 2008). Burrowing owls tend to be opportunistic feeders, and a large portion of their diet consists of mainly beetles and grasshoppers, and other larger arthropods and consumption of insects increases during the breeding season (Haug et al. 1993). Small mammals, especially mice and voles (*Microtus* and *Peromyscus* spp.) are important food items, and other prey animals include herpetofauna, young cottontail rabbits, bats, and birds such as sparrows and horned larks.

Phase I through III protocol-level surveys conducted in spring and summer 2009 identified two nesting pairs with juveniles and four active burrows (Figure 14; CEC 2010). One pair with juveniles was observed using two burrows near the center of the site, and a second pair with juveniles was observed using two burrows near the northwest corner of the site (WEST 2016).

Survey results from 2009 indicated that a total of 4 burrowing owls with active burrows within the Project site (CEC 2010). Surveys performed in 2016 identified five burrows with sign (e.g., whitewash, pellets, and/or feathers) within the Project site. Based on the results of several years of surveys, the Project site supports resident burrowing owl in low densities. Breeding season surveys were not performed in 2016 because the total number of burrows with sign was consistent with surveys performed in 2009, which included breeding season surveys that resulted in two pairs of reproducing burrowing owls on the Project site. The potential for burrowing owl occupancy within the Project did not vary substantially between 2009 and 2016 based on the number of burrows containing sign recorded during surveys.



F:\Ironwood-Server\Share\GIS\Projects\Palen EDF - Maverick\Updated 110816\BRTR Fig 14 - Western Burrowing Owl.mxd | 11/8/2016

The PSPP PA/FEIS (Section 3.23) asserted that the majority of the PSPP disturbance area contained suitable habitat for western burrowing owl and may support approximately four active burrows, which is consistent with the current conditions of the Project. The potential for western burrowing owl to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.9 Golden Eagle

Background

Golden eagles are a Federal bird species of conservation concern and are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668a - d, as amended), and are typically year-round residents throughout most of their western United States range. They breed from late January through August with peak activity March through July (Kochert et al. 2002). Migratory patterns are usually fairly local in California where adults are relatively sedentary, but dispersing juveniles sometimes migrate south in the fall. Habitat for golden eagles typically includes rolling foothills, mountain areas, and deserts. Golden eagles need open terrain for hunting and prefer grasslands, deserts, savanna, and early successional stages of forest and shrub habitats. Golden eagles primarily prey on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion (Kochert et al. 2002). This species prefers to nest in rugged, open habitats with canyons and escarpments, often with overhanging ledges and cliffs or large trees used as cover.

Recent data analysis and population modeling suggest the status of the golden eagle population in the western United States is gradually declining towards a new lower equilibrium of about 26,000 individuals, down from an estimated 34,000 in 2009 and 2014 (USFWS 2016). The future population estimate relies on the continuation of current ecological and biological conditions. The authors estimate 3,400 golden eagles die annually from anthropogenic causes in the United States (USFWS 2016), and suggest a level of sustainable take is approximately 2,000 individuals annually. The authors add that additional unmitigated mortality will steepen the rate of decline that the golden eagle population is presently undergoing (USFWS 2016).

In the absence of interference from humans, breeding density is determined by either prey density or nest site availability (CEC 2010) of breeding season home ranges from several western United States studies showed an average home range of 20–33 square kilometers (7.7 to 12.7 square miles) that ranged from 1.9 to 83.3 square kilometers (0.7 to 32.2 square miles). In San Diego, a study of 27 nesting pairs found breeding ranges to be an average of 36 square miles with a range from 19 to 59 square miles (CEC 2010). Other studies from within and outside the United States include ranges from 9 to 74.2 square [range of 14.7 to 26.1 pairs per 1,000 square kilometers, or 386 square miles]) (CEC 2010).

Nest Surveys

There is no suitable eagle nesting habitat on the Project site. The site supports suitable foraging habitat, albeit low potential (WEST 2016). Nest surveys performed in 2010, 2012, 2013, 2014, and 2015 encompassed a 10-mile radius of the Project site with the objective of identifying and characterizing golden eagle occurrences proximate to the Project site.

In spring 2010, aerial surveys found two active golden eagle nests within one territory, approximately 7 miles southwest of the Project site in the Chuckwalla Mountains. Additionally, three inactive nests were located approximately 6 miles southwest of the Project site in the Chuckwalla Mountains; two of these nests were associated with the aforementioned active territory, the other was likely associated with a territory located further south (Solar Millennium, 2010c).

The 2012 golden eagle surveys performed by BioResource Consultants Inc. investigated 397 golden eagle nesting sites in the BLM California Desert District (CDD). Within the entire CDD, 74 sites were determined occupied (as indicated by courtship, a pair present, or the nest being maintained), of which 44 were active (as evidenced by incubation, eggs, brooding, chicks, and fledglings). No nest sites within 10 miles of the Project site were found to be occupied. Two golden eagle observations to the Project site were located greater than 14 miles north within the Little Maria and Granite Mountains, both of which had unknown status with no nesting observed.

In spring and summer 2013, aerial and ground-based surveys identified no active golden eagle within the 10-mile radius of the Project site, including the Palen Mountains. A single golden eagle observation was recorded: a third-year golden eagle flying around the cliffs in the southwestern portion of the Palen Mountains (WEST 2016). Twelve inactive golden eagle nests were recorded (WEST 2016).

Three potential golden eagle nests were identified in the Palen Mountains; two nests were inactive while the third was recently active by red-tailed hawks, which over the decades probably has alternated usage between red-tailed hawks and golden eagles with most recent use associated with red-tailed hawks (Bloom Biological, 2013c). Several active and inactive red-tailed hawk territories were identified, all in cliffs (Bloom Biological, 2013c). No physical signs of active golden eagle nesting activity (e.g., eagles, eagle white wash, fresh nest material, etc.) was observed at any of the previously known nest sites in the Chuckwalla Mountains; however, the altitude that aerial surveys were flown in this region (above 1,500 ft) limited the certainty of aerial survey results (BBI 2013c). Follow-up ground-based surveys were conducted on foot in the Chuckwalla Mountains in April 2013, to visit and observe potential golden eagle nest sites identified during aerial surveys. No eagle nests were identified during ground-based surveys in the Coxcomb Mountains within the 10-mile radius of the Project site (BBI 2013c). No eagle

nests were identified during aerial surveys of the approximately 22-mile length of east-west trending DPV2 power lines within the 10-mile radius of the Project site; however, several active red-tailed hawk nests were recorded (BBI 2013c).

Under ideal environmental conditions, the 10-mile radius around the Project site might support up to eight golden eagle territories (WEST 2016). In 2013, none of the eight approximated territories were active or exhibited sign of activity. The observed low numbers of golden eagles within the Project study area was consistent between several years of surveys and typical of the California deserts in that there is a relatively high probability that golden eagle nesting territories are vacant or contain inactive nests due to low prey availability (WEST 2016).

During the 2014 surveys, all previously described golden eagle nests were monitored, as well as a number of additional nests. In total, 35 eagle nests were documented during the April and July surveys. None of the nests newly identified in 2014 showed signs of recent activity. Moreover, no golden eagles were observed during aerial or ground-based surveys (WEST 2016). During the spring 2015 ground-based surveys, 20 previously observed golden eagle nests and one newly discovered nest were monitored. Sixteen nests showed no signs of occupancy, three nest territories were occupied by red-tailed hawks in early stages of visiting/refurbishing nests, and two nests were being actively occupied by red-tailed hawks incubating or raising. The newly identified nest did not show signs of recent activity. In summary, none of the previously-identified golden eagle territories, which were visited in spring 2015, were determined to be occupied by golden eagles (WEST 2016).

Winter Surveys

Surveys were performed in January and February 2013 that involved visual surveys and six baiting stations. A single sub adult was present all five weeks at bait station 6 located in the Palen Mountains north of the site, feeding on the carcass 2-3 days each week. No other golden eagles were observed during any of the six full-length survey sessions (BBI 2013e).

Prey Abundance Surveys

In 2013, 196.5 km (122 miles) of transects were performed within and adjacent to the solar facility area, which resulted in seventeen black-tailed jackrabbits and one desert cottontail observations. Observations were concentrated in two general areas: southeast extent of the Project site near the I-10 and smaller cluster in the north-central part of the Project site. Fewer lagomorph observations were noted in 2016 than in 2013 during the 1,273 km (791 miles) of transects performed at more variable daily time periods. The low abundance of lagomorphs may have been further reduced over the recent several years due to the presence of a local coyote population that is likely subsidized by the nearby agricultural lands. Although the site remains suitable for foraging by golden eagles, it supported a relatively low density of

lagomorphs during 2013 surveys under conditions similar to those of 2016, a year in which low densities of lagomorphs also appear to persist.

Summary

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area was located more than one mile from suitable nesting habitat for golden eagles and the nearest active nest was approximately seven miles from the site. The potential for golden eagles to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.10 Loggerhead Shrike

The Loggerhead shrike (*Lanius ludovicianus*) is currently considered a CDFW Bird Species of Special Concern (nesting), and a USFWS Bird of Conservation Concern. Loggerhead shrikes are small predatory birds that are uncommon residents throughout most of the southern portion of their range, including southern California. In southern California, they are generally much more common in interior desert regions than along the coast (Humple 2008). This species can be found within lowland, open habitat types, including creosote scrub and other desert habitats, sage scrub, non-native grasslands, chaparral, riparian, croplands, and areas characterized by open scattered trees and shrubs. Fences, posts, or other potential perches are typically present. Loss of habitat to agriculture, development, and invasive species is a major threat; this species has shown a significant decline in the Sonoran Desert (Humple 2008). Loggerhead shrikes initiate their breeding season in February and may continue with raising a second brood as late as July; they often re-nest if their first nest fails or to raise a second brood (Yosef 1996). In general, loggerhead shrikes prey upon large insects, small birds, amphibians, reptiles, and small rodents over open ground within areas of short vegetation, usually impaling prey on thorns, wire barbs, or sharp twigs to cache for later feeding (Yosef 1996).

The Project site contains suitable habitat for loggerhead shrike (CEC 2010). Loggerhead shrikes were observed within the Project site during spring 2009 and 2010 surveys (Figure 15; CEC 2010). The species also was observed during spring 2013 avian field survey along the gen-tie line. Loggerhead shrike was also recorded during the 2016 surveys.

The PSPP PA/FEIS (Section 3.23) asserted that the entire PSPP disturbance area contained suitable nesting and foraging habitat for loggerhead shrike, which is consistent with the current conditions of the Project. The potential for loggerhead shrike to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

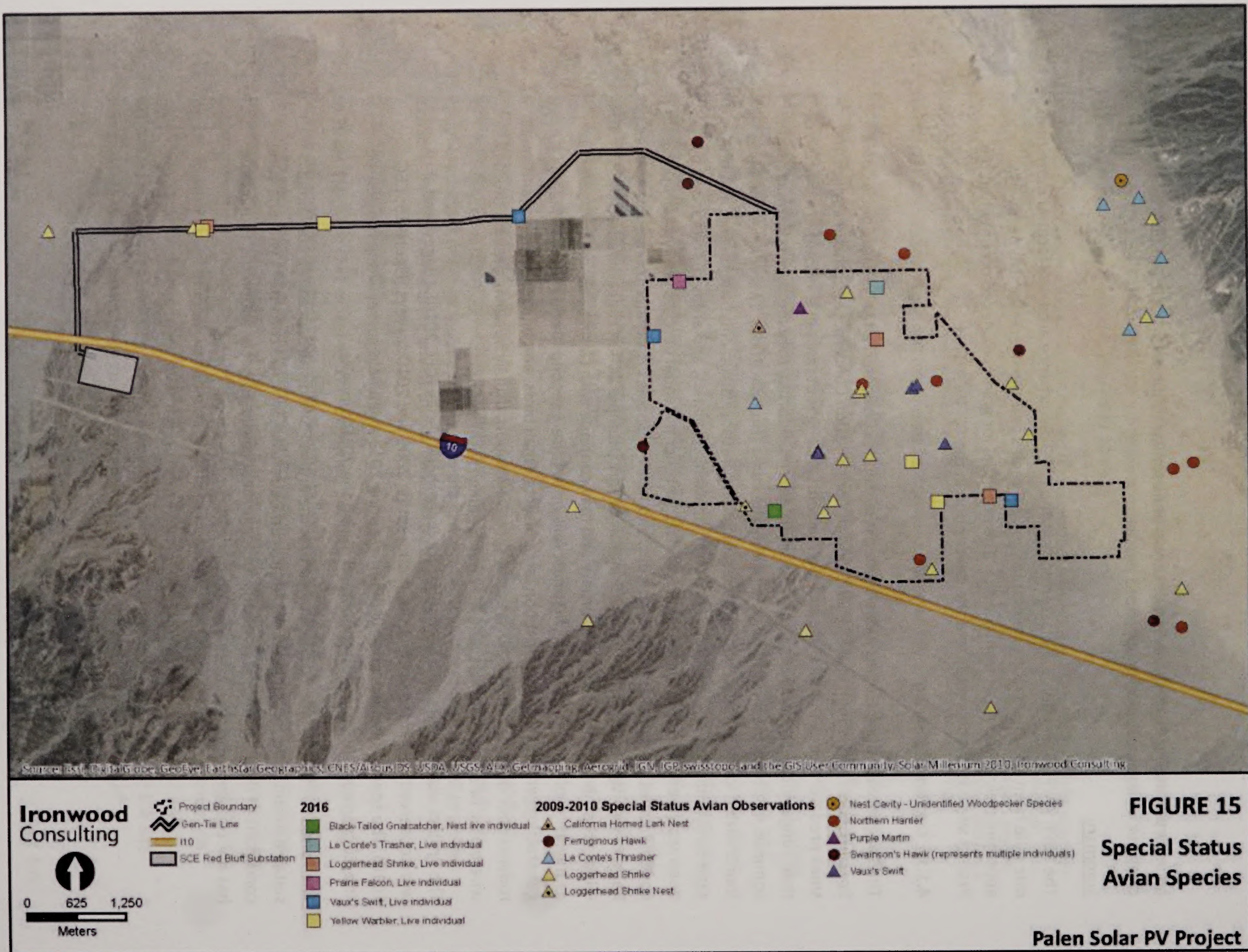


FIGURE 15

Special Status Avian Species

Palen Solar PV Project

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4.1.11 Le Conte's Thrasher

In California, Le Conte's thrasher (*Toxostoma lecontei*) is a resident in the San Joaquin Valley and the Mojave and Colorado Deserts (Weigand and Fitton 2008). This pale gray bird occurs in desert flats, washes and alluvial fans with sandy and/or alkaline soil and scattered shrubs. Preferred nest substrate includes thorny shrubs and small desert trees, and nesting rarely occurs in monotypic creosote scrub habitat or Sonoran Desert woodlands (Prescott 2005). Breeding activity occurs from January to early June, with a peak from mid- March to mid-April. Le Conte's thrashers forage for food by digging and probing in the soil. They eat arthropods, small lizards and snakes, and seeds and fruit; the bulk of their diet consists of beetles, caterpillars, scorpions, and spiders.

Suitable habitat for Le Conte's thrasher is located in the Project site, primarily within desert dry wash woodland. This species was observed during 2009 surveys, including avian-specific surveys conducted between 2010 and 2013 (CEC 2010; WEST 2016), as well as in spring 2016 (Figure 15).

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable habitat for Le Conte's thrasher primarily within desert dry wash woodland, which is consistent with the current conditions of the Project. The potential for Le Conte's thrasher to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.12 California Horned Lark

The California horned lark (*Eremophila alpestris actia*) is currently on the CDFW watch list. It is found throughout California except the north coast, and is less common in mountainous areas. This species prefers open areas that are barren or with short vegetation including deserts, brushy flats, and agricultural areas, and includes creosote scrub. Eggs are laid March to early June, and this species frequently lays a second clutch (Zeiner 1990). There are numerous records for this species in western Riverside County (CNDDB 2016). The Project site contains suitable habitat for this species, and it was observed frequently on the Project site, including the gen-tie line, during 2009 and 2010 surveys and during spring 2013 avian field surveys (Figure 15; WEST 2016).

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable habitat for California horned lark primarily within creosote bush scrub, which is consistent with the current conditions of the Project. The potential for California horned lark to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.13 Prairie Falcon

The prairie falcon (*Falco mexicanus*) is currently on the CDFW watch list, and a USFWS Bird of Conservation Concern. It inhabits dry environments in the North American west from southern Canada to central Mexico. It is found in open habitat at all elevations up to 3,350 m, but is associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. They require cliffs or bluffs for nesting though will sometimes nest in trees, on power line structures, on buildings, or inside caves or stone quarries. Ground squirrels and horned larks are the primary food source, but prairie falcon will also prey on lizards, other small birds, and small rodents (Zeiner 1990).

Prairie falcons were observed several times during Project surveys both as flyovers and perched in the Project site (Figure 15). The entire Project site contains suitable foraging habitat for this species. The Project site does not contain suitable nesting habitat, although mountains located over 3 miles away may provide nesting habitat. There are numerous CNDDB records in the region for this species, including eight records from Little Maria Mountains to the northeast (CEC 2010) and the Chuckwalla Mountains to the southwest (CEC 2010). During golden eagle Phase 2 nest surveys performed jointly for neighboring proposed energy projects, a pair of prairie falcons was documented to be nesting on the same cliff on which the golden eagle nest was located in the Palen Mountains (CEC 2010)

The PSPP PA/FEIS (Section 3.23) asserted that the entire PSPP disturbance area contained suitable foraging habitat and no nesting habitat for prairie falcon, which is consistent with the current conditions of the Project. The potential for prairie falcon to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.14 Gila Woodpecker

Gila woodpecker is designated as endangered in California, a BLM Sensitive Species, and a USFWS Bird of Conservation Concern. Gila woodpecker is predominantly a permanent resident across its range in areas of southeast California, southern Nevada, central Arizona, extreme southwest New Mexico, and parts of Mexico. The Gila woodpecker is an uncommon to fairly common resident in Southern California along the Colorado River, and locally near Brawley, Imperial County (Garrett and Dunn 1981). Suitable habitats include riparian woodlands, uplands with concentrations of large columnar cacti, old- growth xeric-riparian wash woodlands, and urban or suburban residential areas (Rosenberg et al. 1987; Edwards and Schnell 2000). Gila woodpeckers prefer large patches of woody riparian vegetation for nesting (greater than 49 acres), but others have documented the species in various habitat types, such as desert washes (McCreedy 2008) and residential areas (Mills et al. 1989). Suitable habitat within the Project site would be in desert washes, but would be expected to more readily use off-site palm trees than

on-site palo verde or ironwood trees. Surveys conducted in 2013 reported one incidental Gila woodpecker during point count surveys (WEST 2016). The probability of this species nesting on the Project site is low because the site supports sparse riparian woodland habitat and is located on the periphery of the geographic range for this species.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area did not support suitable nesting habitat for Gila woodpecker and that this species was not expected to occur in the project site. One observation of Gila woodpecker was recorded greater than 1 mile from the Project in 2013 during avian point count surveys, which represents a change in potential for this species to occur within the Project site since the description in the PSPP PA/FEIS; however, Gila woodpecker is still not expected to nest within the Project site due to lack of typical nesting habitat.

4.1.15 Black-tailed Gnatcatcher

Black-tailed gnatcatchers (*Polioptila melanura)* are currently on the CDFW watch list. They are permanent residents from southeastern California and Arizona to southern Texas and northern Mexico. They are found in arid scrublands, desert brush, and dry washes amongst creosote bush, ocotillo, mesquite, paloverdes, and cactus. They live pairs all year-round, defend their territory, and forage for small insects amongst low shrubs and trees. Black-tailed gnatcatchers were observed in 2013 and 2016 on the Project site. The Project site contains suitable foraging and potential nesting habitat for this species.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area did not support dense scrub suitable as nesting habitat for black-tailed gnatcatchers. This species was commonly detected during 2013 avian surveys and an active nest was observed in the dry wash woodland in 2016, which represents a change in potential for black-tailed gnatcatchers to occur within the Project site since the description in the PSPP PA/FEIS.

4.1.16 Sonora Yellow Warbler

The Sonora yellow warbler (*Setophaga petechia sonorana*) is currently considered a CDFW Bird Species of Special Concern (breeding), and a USFWS Bird of Conservation Concern. It occurs principally as a migrant and summer resident from late March through early October, and breeds from April to late July (Dunn and Garrett 1997). The Sonora yellow warbler breeds only along the lower Colorado River in California, and from southern Arizona and southwest New Mexico to north-central Mexico and possibly the Colorado River Delta. It arrives to breed on the lower Colorado River in early April and nests mainly from mid-May through July (Rosenberg et al. 1991). They generally occupy riparian shrubs and trees close to water. Its diet includes ants, bees, wasps, caterpillars, beetles, true bugs, flies, and spiders (Beal 1907, Shuford 2008). Sonora yellow warblers were observed during small bird count surveys in 2013 (WEST 2016).

The Project site contains suitable foraging habitat (during migration) and no suitable nesting habitat.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area did not support suitable nesting habitat for Sonora yellow warbler and that this species was not observed during surveys. This species was detected during avian surveys in 2013 and in 2016 and may be present during migration; however, Sonora yellow warbler is not expected to nest within the Project site due to lack of typical nesting habitat, which is consistent with the description in the PSPP PA/FEIS.

4.1.17 Short Eared Owl

The short-eared owl (*Asio flammeus*) is a California Species of Special Concern. It is a widespread winter migrant in central and western California, and generally present from September through April. It is an uncommon winter migrant in southern California. Habitat requirements include grasslands, prairies, dunes, meadows, irrigated lands, and wetlands, and Short-eared owls generally require dense vegetation for roosting and nesting (Shuford 2008). One short-eared owl was detected on site during surveys in 2013 (WEST 2016). The Project site does not provide suitable nesting habitat, although short-eared owls may be found on site incidentally during migration or foraging events.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable wintering habitat and lacked suitable nesting habitat for short-eared owl. One observation of short-eared owl was recorded during avian surveys in 2013; however, this species is not expected to nest within the Project site due to lack of typical nesting habitat, which is consistent with the description in the PSPP PA/FEIS.

4.1.18 Ferruginous Hawk

The ferruginous hawk (*Buteo regalis*) is a California Watch List species, and a USFWS Bird of Conservation Concern. It is an uncommon winter resident and migrant at lower elevations and open grasslands in the Central Valley and Coast Ranges, and a fairly common winter resident of grasslands and agricultural areas in southwestern California (Garrett and Dunn 1981). There are no breeding records from California. This species frequents open grasslands, sagebrush flats, and desert scrub. Prey items include lagomorphs, small mammals, reptiles and amphibians (Zeiner 1990). This species was observed during surveys small bird surveys in 2013 (WEST 2016). The project site provides potential wintering and migration habitat, and does not provide suitable nesting habitat.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable wintering habitat and lacked suitable nesting habitat for ferruginous hawk. Two observations of

ferruginous hawks were recorded during avian surveys in 2013; however, this species is not expected to nest within the Project site due to geographic restrictions, which is consistent with the description in the PSPP PA/FEIS.

4.1.19 Swainson's Hawk

Swainson's hawk (*Buteo swainsoni*) is listed as Threatened by CDFW, and a Bird of Conservation Concern by the USFWS. The Swainson's hawk occurs as a breeding species in open habitats throughout much of the western United States and Canada, and in northern Mexico. In California, breeding populations of Swainson's hawks occur in desert, shrub and grasslands, and agricultural habitats; however, most of the state's breeding sites are in the Great Basin and Central Valley (Woodbridge 1998). These birds favor open habitats for foraging, and are near-exclusive insectivores as adults, but may also forage on small mammals and reptiles. This species was observed during surveys small bird surveys in 2013 (WEST 2016). The project site provides potential migration habitat, and does not provide suitable nesting habitat.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable foraging habitat during migration and lacked suitable nesting habitat for Swainson's hawk, which is consistent with the current condition of the Project site. The potential for Swainson's hawk to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.20 American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus anatum*) is listed as CDFW Fully Protected species, and considered a USFWS Bird of Conservation Concern. It is distributed worldwide. In California, range is primarily central to northern California, with wintering habitat located in southern California. Migrants occur along the coast and in the western Sierra Nevada in spring and fall. It breeds mostly in woodland, forest, and coastal habitats, and favors open landscapes with cliffs as nest sites. Their diet consists primarily of birds and bats (Zeiner 1990). This species was located during bird-use count surveys in 2013 (WEST 2016). The project site provides suitable foraging habitat, and no suitable nesting habitat occurs on site.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable foraging habitat and no nesting habitat for American peregrine falcon, which is consistent with the current conditions of the Project. The potential for prairie falcon to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.21 Vaux's Swift

Vaux's swift (*Chaetura vauxi*) is a CDFW Species of Special Concern. It is a summer resident of northern California and a fairly common migrant throughout most of the state in spring and fall. It roosts in hollow trees and snags, and often in large flocks. Vaux's swifts feed exclusively on flying insects (Shuford 2008). This species was observed during small bird count surveys that were completed in 2013 (WEST 2016). Vaux's swift was also detected during spring 2016 surveys. The project site provides suitable habitat during migration, and no suitable nesting habitat.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable foraging habitat during migration and lacked suitable nesting habitat for Vaux's swift, which is consistent with the current condition of the Project site. The potential for Vaux's swift to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.22 Mountain Plover

Mountain plover (*Charadrius montanus)* is a CDFW Species of Special Concern, and a USFWS Bird of Conservation Concern. They are found in semi-arid plains, grasslands, and plateaus. They use open grasslands, plowed fields with little vegetation, and open sagebrush areas. Winter habitats include desert flats, and plowed fields. Mountain plovers are insectivores, feeding primarily on large ground-dwelling insects, including grasshoppers, beetles, and crickets (Shuford 2008). This species' distribution was modeled as occurring in the Chuckwalla Valley (CEC 2014a). One mountain plover was observed during bird use count surveys in 2013 (WEST 2016). The project site provides suitable habitat during migration, and is not likely to support suitable nesting habitat.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable foraging habitat during migration/winter and lacked suitable nesting habitat for mountain plover, which is consistent with the current condition of the Project site. The potential for mountain plover to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.23 Northern Harrier

Northern harrier (*Circus cyaneus)* is a CDFW Species of Special Concern. It inhabits most of California at various times of the year, found in elevations up to 3000m. Northern harriers frequent meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands. They are a widespread winter resident and migrant in suitable habitat. They primarily feed on small mammals, birds, frogs, small reptiles, crustaceans, and insects (Zeiner 1990).

Northern harriers were found on site during previous surveys on the Project site (WEST 2016). There is suitable foraging, and no suitable nesting habitat on the Project site.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area contained suitable foraging habitat during migration/winter and lacked suitable nesting habitat for northern harrier, which is consistent with the current condition of the Project site. The potential for northern harrier to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.24 Yellow-breasted Chat

The yellow-breasted chat (*Icteria virens*) is a CDFW Species of Special Concern. It is an uncommon summer resident and migrant in coastal California, in foothills of the Sierra Nevada, and within the Colorado Desert is known only from the Salton Sea and Colorado River. In southern California, chats breed locally on the coast, and very locally inland (Garrett and Dunn 1981). During migration, they may be found in lower elevations of mountains in riparian habitat (McCaskie et al. 1979; Shuford 1990). Yellow-breasted chat was recorded during small bird count surveys that were conducted in 2013, likely during migration (WEST 2016). The yellow-breasted chat may be found incidentally on site during migration, but suitable nesting habitat is not present.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area did not contain suitable habitat for yellow-breasted chat. One observation of yellow-breasted chat was recorded during avian surveys in 2013; however, this species is not expected to nest within the Project site due to lack of typical nesting habitat, which is consistent with the description in the PSPP PA/FEIS.

4.1.25 Crissal's Thrasher

Crissal's thrasher (*Toxostoma crissale*) is a CDFW Species of Special Concern. This species is a resident of southeastern deserts, occupying dense shrubs in desert riparian and desert wash habitats, including mesquite, ironwood, and acacia. This thrasher primarily forages on the ground, feeding on invertebrates, berries, and seeds (Bent 1948; Shuford 2008). One observation of Crissal's thrasher was recorded during small bird count surveys in 2013 (WEST 2016). The project site provides limited but suitable nesting and foraging habitat primarily associated with dry wash woodlands.

The PSPP PA/FEIS (Section 3.23) asserted that the PSPP disturbance area supported limited dense scrub suitable as nesting habitat for Crissal's thrasher, which is consistent with the current condition of the Project site. The potential for Crissal's thrasher to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.1.26 Other Listed Bird Species

No suitable breeding or wintering habitat for State or Federal listed bird species occurs within or near the Project; however, incidental detections of listed bird species including western yellow-billed cuckoo, willow flycatcher, Bell's vireos, and Ridgeway's [Yuma Ridgway's] rail have been recorded at existing utility-scale solar projects in California. Thus, an assessment of the Project's potential effects to these species was performed (Appendix E). Western yellow-billed cuckoo, willow flycatcher, and Bell's vireo breed in riparian habitats in California, winter south of the United States-Mexico border, and migrate though the Colorado Desert between breeding and wintering habitats. Yuma Ridgway's rail nests in freshwater marshes and is distinct from the other listed bird species in that they are not known to regularly migrate between areas of breeding habitat. Additional information is provided in Appendix E.

4.2 Special Status Plant Species

Forty-one special status plant species were reviewed for their potential to occur within the Project site and its vicinity based on regional plans and database records (Table 6; CNDDB 2016, CEC 2014c). The status of each species has been updated (CNPS 2016). Special status species that were detected within the Project site, buffer, or have moderate potential to occur based on the presence of suitable habitat within the Project site are discussed further in this section. Species that were determined to have a low probability of occurrence due to the absence of suitable habitat, differences in elevation range, or significant distance from known geographic range are detailed in Appendix C. A cumulative list of all plant species observed during previous surveys in included in Appendix D.

Two special status plant species were observed within the Project site during spring 2009, 2010, and 2017 surveys: Harwood's milk-vetch and ribbed cryptantha (Figure 16). Other sensitive plants recorded outside the project site or along the gen-tie were Harwood's eriastrum, California ditaxis, and Utah vining milkweed. In spring 2017, Harwood's eriastrum was recorded within the far eastern edge of the Project site, primarily within Zone II (Figure 16). A relatively new taxon of *Atriplex* was documented on the saline lake margin approximately 650m north of the Project site (Andre, pers. comm.). The previous locations of this species were relocated and populations were reconfirmed during the 2016 surveys.

No special status plant species were detected within the Project site during fall surveys in October 2010 botanical surveys. This fall survey was considered effective for late-season blooming species given that summer/fall annual plant species were detected in bloom and/or fruit within and in the vicinity. Eight common annual species were observed in bloom and/or fruit, and 17 common perennial species were observed in bloom and/or fruit, including 8 previously undocumented common species that were added to the floral inventory.

Table 6 - Special Status Plant Species

COMMON NAME	*SCIENTIFIC NAME*	**STATUS** STATE/FED/CRPR/BLM/ GLOBAL RANK/STATE RANK	BLOOMING PERIOD	POTENTIAL TO OCCUR ON THE PROJECT SITE
Chaparral sand verbena	*Abronia villosa* var. *aurita*	__/__/1B.1/BLM Sensitive_/G5T2T3/S2	Jan-Sep	Low. Not observed.
Angel trumpets	*Acleisanthes longiflora*	__/__/2B.3/__/G5/S1	May	Low. Not observed
Desert sand parsley	*Ammoselinum giganteum*	__/__/2B.1/__/G2G3/SH	Mar-Apr	Low. Not observed
Small-flowered androstephium	*Androstephium breviflorum*	__/__/2B.2/__/G4/S2	Mar-Apr	Low. Not observed
Harwood's milkvetch	*Astragalus insularis* var. *harwoodii*	__/__/2B.2/__/G5T3/S2	Jan-May	**Present.** Recorded within solar facility study area
Coachella Valley milkvetch	*Astragalus lentiginosus* var. *coachellae*	__/FE/1B.2/BLM Sensitive/G5T1/S1	Feb-May	Low. Not observed
California ayenia	*Ayenia compacta*	__/__/2B.3/__/G4/S3	Mar-Apr	Low. Not observed
Pink fairy duster	*Calliandra eriophylla*	__/__/2B.3/__/G5/S3	Jan-Mar	Low. Not observed
Sand evening-primrose	*Camissonia arenaria*	__/__/2B.2/__/G4?/S2S3	Nov-May	Low. Not observed
Crucifixion thorn	*Castela emoryi*	__/__/2B.2/__/G3G4/S2S3	Apr-Oct	Low. Not observed
Abram's spurge	*Chamaesyce abramsiana*	__/__/2B.2/__/G4/S2	Aug-Nov	Moderate. Not observed
Arizona spurge	*Chamaesyce arizonica*	__/__/2B.3/__/G5/S3	Mar-Apr	Low. Not observed
Flat-seeded spurge	*Chamaesyce platysperma*	__/__/1B.2/ BLM Sensitive / G3/S1	Feb-Sep	Low. Not observed
Las Animas colubrina	*Colubrina californica*	__/__/2B.3/__/G4/S2S3	Apr-Jun	Low. Not observed
Spiny abrojo	*Condalia globosa* var. *pubescens*	__/__/4.2/__/G5T4/S3	Mar-Nov	**Present**. Recorded within the southwestern terminus of the gen-tie
Foxtail cactus	*Coryphantha alversonii*	__/__/4.3/__/G3/S3	Apr-Jun	Low. Not observed
Ribbed cryptantha	*Cryptantha costata*	__/__/4.3/__/G4G5/S3.3	Feb-May	**Present.** Recorded within the northern and eastern portions of the

COMMON NAME	***SCIENTIFIC NAME***	**STATUS** STATE/FED/CRPR/BLM/ GLOBAL RANK/STATE RANK	**BLOOMING PERIOD**	**POTENTIAL TO OCCUR ON THE PROJECT SITE**
				solar facility study area
Winged cryptantha	*Cryptantha holoptera*	__/__/4.3/__/G4G5/S4	Mar-Apr	Low. Not observed
Wiggins' cholla	*Cylindropuntia wigginsii* [=*Opuntia wigginsii*]	__/__/3.3/__/G3?Q/S1?	Mar	Low. Not observed
Utah milkvine	*Cynanchum utahense* (syn=[=*Funastrum utahense*]	__/__/4.2/__/G4/S4	Mar-Oct	Low. Recorded offsite
Glandular ditaxis	*Ditaxis claryana*	__/__/2B.2/__/G3G4/S2	Oct-Mar	Moderate. Not observed
California ditaxis	*Ditaxis serrata* var. *californica*	__/__/3.2/__/G5T3T4/S2?	Mar-Dec	**Present.** Recorded along western extent of the gen-tie
Cottontop cactus	*Echinocactus polycephalus* var. *polycephalus*	__/__/ CBR /__/__/__	Mar-Aug	Low. Recorded offsite
Harwood's Eriastrum	*Eriastrum harwoodii*	__/__/1B.2/BLM Sensitive_/G2	Mar-Jun	**Present.** Recorded within eastern edge of solar facility study area
California satintail	*Imperata brevifolia*	__/__/2B.1__/G3/S3	Sep-May	Low. Not observed
Pink velvet mallow	*Horsfordia alata*	__/__/4.3/__/G5/S4	Feb-Dec	Low. Not observed
Bitter hymenoxys	*Hymenoxys odorata*	__/__/2B.1/__/G5/S2	Feb-Nov	Low. Not observed
Spearleaf	*Matelea parvifolia*	__/__/2B.3/__/G5?/S3	Mar-May	Low. Not observed
Argus blazing star	*Mentzelia puberula*	__/__/2B.2/__/G5/S2	Mar-May	Low. Not observed
Slender cotton-heads	*Nemacaulis denudata* var. *gracilis*	__/__/2B.2/__/G3G4T3?/S2	Mar-May	Low. Not observed
Lobed cherry	*Physalis lobata*	__/__/2.B3/__/G5/S1S2	May-Jan	Moderate. Not observed
Desert portulaca	*Portulaca halimoides*	__/__/4.2/__/G5/S3	Sep	Low. Not observed
Desert unicorn plant	*Proboscidea althaeifolia*	__/__/4.3/__/G5/S4	May-Oct	Moderate. Not observed
Orocopia sage	*Salvia greatae*	__/__/1B.3/BLM Sensitive/G2G3/S2S3	Mar-Apr	Low. Not observed

COMMON NAME	*SCIENTIFIC NAME*	**STATUS** STATE/FED/CRPR/BLM/ GLOBAL RANK/STATE RANK	BLOOMING PERIOD	POTENTIAL TO OCCUR ON THE PROJECT SITE
Desert spikemoss	*Selaginella eremophila*	__/__/2B.2/__/G4/S2S3	May-Jul	Low. Not observed
Cove's cassia	*Senna covesii*	__/__/2B.2/__/G5/S3	Mar-Aug	Low. Not observed
Mesquite nest straw	*Stylocline sonorensis*	__/__/2A/__/G3G5/SX	Apr	Low. Not observed
Dwarf germander	*Teucrium cubense ssp. depressum*	__/__/2B.2/__/G4G5T3T4/S2	Mar-Nov	Low. Not observed
Jackass clover	*Wislizenia refracta ssp. refracta*	__/__/2B.2/__/G5T5?/S1	Apr-Nov	Moderate. Not observed
Palmer's jackass clover	*Wislizenia refracta ssp. palmeri*	__/__/2B.2/__/G5T2T4/S1	Jan-Dec	Moderate. Not observed
"Palen Lake atriplex"	*Atriplex sp. nov. J. Andre (Atriplex canescens ssp.)*	__/_/_/BLM Sensitive_/_/	May-Jun	Low. Recorded offsite

Federal FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range

FT = Federally listed, threatened: species likely to become endangered within the foreseeable future

California Rare Plant Rank (CRPR)

CRPR 1A = Presumed extinct

CRPR 1B = Rare, threatened, or endangered in California and elsewhere

CRPR 2 = Rare, threatened, or endangered in California but more common elsewhere

CRPR 3 = Plants which need more information

CRPR 4 = Limited distribution – a watch list

CBR = Considered But Rejected

.1 = Seriously endangered in California (high degree/immediacy of threat; over 80% of occurrences threatened)

.2 = Fairly endangered in California (moderate degree/immediacy of threat; 20%-80% of occurrences threatened)

.3 = Not very endangered in California (low degree/immediacy of threats or no current threats known; <20% of occurrences threatened or no current threats known)

Bureau of Land Management

BLM Sensitive = BLM Manual §6840 defines sensitive species as"those species that are (1) under status review by the FWS/NMFS; or (2) whose numbers are declining so rapidly that Federal listing may become necessary, or (3) with typically small and widely dispersed populations; or (4) those inhabiting ecological refugia or other specialized or unique habitats. BLM, 2001

Global Rank/State Rank

Global rank (G-rank) is a reflection of the overall condition of an element throughout its global range. Subspecies are denoted by a T-Rank; multiple rankings indicate a range of values

G1 = Critically Imperiled.

G2 = Imperiled.

G3 = Vulnerable.

G4 = Apparently secure. This rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.

G5 = Secure. Population or stand demonstrably secure to ineradicable due to being commonly found in the world.

State rank (S-rank) is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank. An H-rank indicates that all sites are historical.

SX = Presumed Extirpated

SH = Possibly Extirpated

S1 = Critically Imperiled

S2 = Imperiled

S3 = Vulnerable

.1 = undefined in new classification system; under old system, this meant very threatened in California

.2 = undefined in new classification system; under old system, this meant threatened in California

.3 = undefined in new classification system; under old system, this meant no current threats known in California

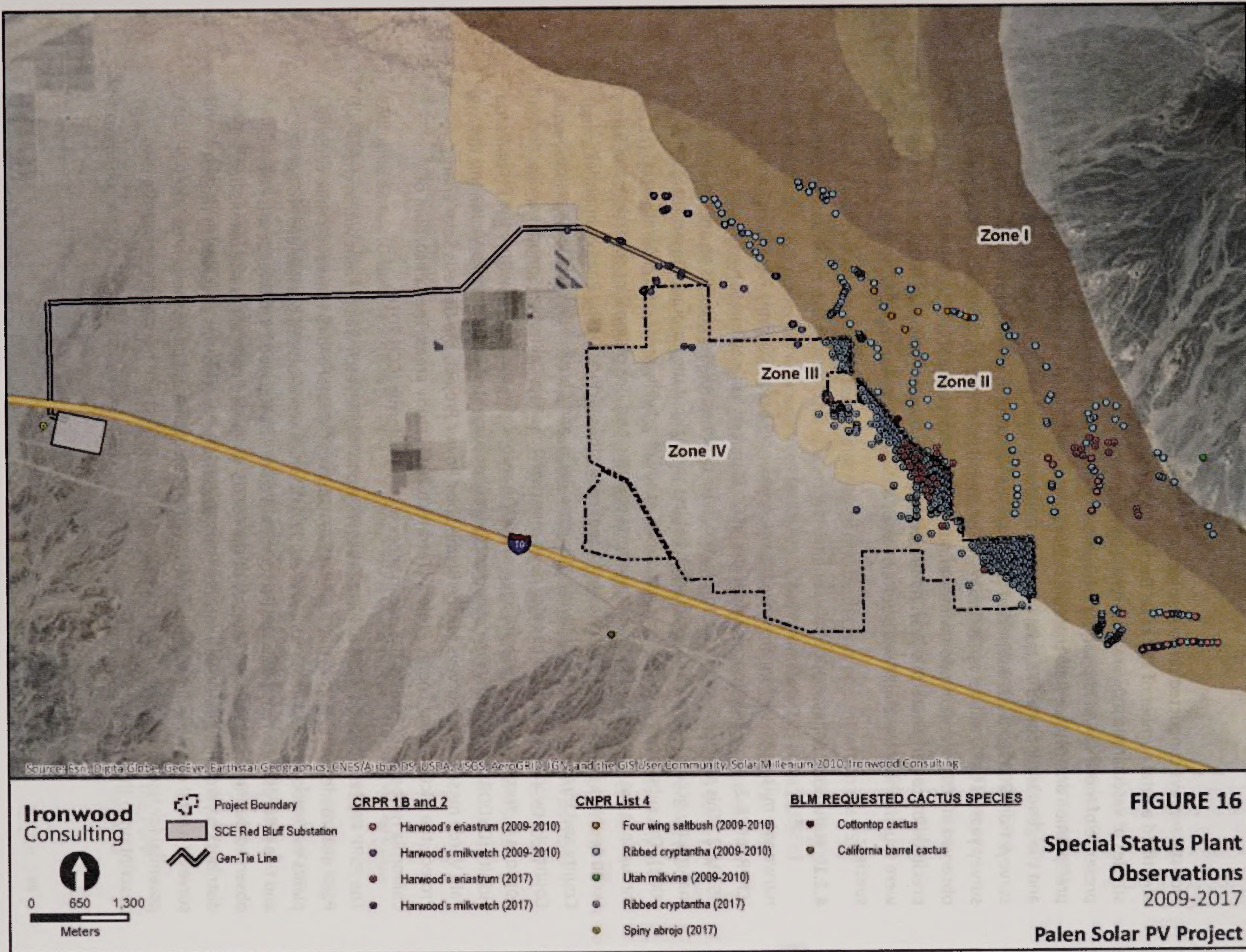

FIGURE 16

Special Status Plant Observations
2009-2017

Palen Solar PV Project

C:\Users\steven.hoerber\Documents\ArcGIS\Packages\BRTR Fig 16 - Special Status Plant Species_77BAF188-C45F-4FDA-86DE-9C9D0FDECF69\v10\BRTR Fig 16 - Special Status Plant Species.mxd | 4/12/2017

Floristic surveys conducted on the project site, buffers, and gen-tie from 2009 through 2016 identified a total number of 167 taxa. During the spring 2016 surveys, a combined total of 92 species of vascular plants were observed. Higher diversity along the gen-tie was a result of the presence of more varied habitat, topographical features, and possibly more localized precipitation and surface flow than the solar facility area. The solar facility supported 63 taxa and the gen-tie supported 73 taxa, including 16 new taxa not previously recorded. The original surveys from 2009 and 2010 reported 151 taxa. The variation in species richness between survey years is likely due to variations in winter rainfall (Section 2.4). Most of the taxa not observed in 2016 were common winter annuals, which likely did not receive enough precipitation to germinate this year. Additional species previously recorded in 2009 and 2010 were found within the 1-mile wide buffer, which included more varying habitats and associated species.

4.2.1 Harwood's Milkvetch

Harwood's milk-vetch (*Astragalus insularis* var. *harwoodii*) has a California Rare Plant Rank (CRPR) of 2B.2, is covered species under the NECO Plan, and has a NatureServe rank of G5T3/S2. This species is rare in California, but more common elsewhere. It is an annual herb that mainly occurs in Sonoran Desert scrub habitat throughout the Colorado Desert (BLM CDD 2002). This subspecies is found in desert dunes, sandy or gravelly areas, and ruderal swales throughout the Mojavean and Sonoran deserts covering portions of Imperial, Riverside, and San Diego counties (CNPS 2016). Historic and recent collections include Ogilby Road in Imperial County and three locales west of Blythe, the Pinto Basin, and Chuckwalla Basin in Riverside County. Harwood's milk-vetch has also been reported from Baja California, Sonora Mexico, and portions of Yuma County. There are several CNDDB records for this species within the Project vicinity (CNDDB 2016). Many new occurrences were documented in Chuckwalla Valley and the Palo Verde mesa during surveys for the Blythe Solar Power Project, the Genesis Solar Energy Project, the McCoy Solar Energy Project (Tetratech 2011) study areas. The Consortium of California Herbaria (CCH) lists 103 occurrences within California (CCH 2016).

The PSPP PA/FEIS (Section 3.18) asserted that Harwood's milk-vetch was present within the PSPP disturbance area. During the 2009 and 2010 surveys, a total of 146 Harwood's milk-vetch plants were documented in the survey area, 97% of which were located outside the Project site, and five records occurred within the Project site (Figure 16). Harwood's milkvetch was not observed during the March 2013 survey of the PSEGS' proposed natural gas line extension, distribution yard, and gen-tie line reroute (Karl 2013a). This species was observed in the 2017 surveys: a total of nine individual plants within the Project site and along the gen-tie. The potential for Harwood's milk-vetch to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.2.2 Ribbed Cryptantha

Ribbed cryptantha (*Cryptantha costata*) has a CRPR of 4.3 and a NatureServe rank of G4G5/S3.3, which suggested a limited distribution but it is not threatened in California. It typically occurs in loose friable soils, especially sand, in the eastern Mojave and Sonoran deserts in Imperial, Riverside, San Diego, and San Bernardino counties and into Arizona and south to Baja California, Mexico (CNPS 2016). It commonly occurs in stabilized and partially stabilized desert dunes and sandy areas of Sonoran and Mojave Desert creosote bush scrub. There are 258 records of this species from several locations throughout Riverside, Imperial, San Diego, and Imperial counties (CCH 2016). A large local population of ribbed cryptantha was identified during the 2010 surveys and ancillary surveys for other nearby projects (Tetratech 2011).

The PSPP PA/FEIS (Section 3.18) asserted that ribbed cryptantha was present within the PSPP disturbance area. Plant estimates of this species were made using sub-sampling methods and an estimate of 8,903 plants per acre was used (BLM 2011). Approximately 285 acres (18%) of occupied habitat were estimated to occur within the proposed PSPP disturbance area. The Project will likely avoid many of these previously recorded populations that occur off the boundary to the east. Ribbed cryptantha was not observed during a March 30, 2013 survey of the PSEGS' proposed natural gas line extension, distribution yard, and gen-tie line reroute (Karl 2013a). This species was not observed on the Project site during surveys performed in May 2016, although approximately 320 dried-up skeletons of ribbed cryptantha were identified approximately 1,500 meters east of the Project site during reference site visits in April 2016. Surveys performed in spring 2017 documented ribbed cryptantha within the eastern portions of the Project site, within Zone II, and occurredIII, occurring in densities similar to the estimates obtained through previous sampling. The potential for ribbed cryptantha to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.2.3 California Ditaxis

California ditaxis (*Ditaxis serrata* var. *californica*) has a CRPR of 3.2 and a NatureServe rank of G5T3T4/S2, which indicates more information is needed about the status of this species. California ditaxis may be a glabrous variety of the common *Ditaxis neomexicana* and appears to be a rare variety of the common species (CEC 2010). This species occupies Sonoran Desert scrub habitat, and prefers sandy washes and alluvial fans of the foothills and lower desert slopes, from 100 to 3,000 feet above mean sea level. Reports of this species are known from San Bernardino, Riverside, Imperial, San Diego, and Sonora, Mexico (CNPS 2016). There are 40 records of this species in California, primarily from Riverside County (CCH 2016).

The PSPP PA/FEIS (Section 3.18) asserted that California ditaxis was present within the PSPP disturbance area. A total of 22 California ditaxis plants were documented in the survey area

during the 2010 surveys: 11 of the observations were located over 7 miles west of the gen-tie and 11 observations were located within a tight cluster along the gen-tie line alignment (Figure 16). California ditaxis was not observed during a March 30, 2013 survey of the PSEGS' proposed natural gas line extension, distribution yard, and gen-tie line reroute (Karl 2013a). This species was not observed during surveys performed on the Project site in 2016 or 2017; however, *D. neomexicana* was observed occasionally across the Project site and gen-tie, in flowering and fruiting condition. It is notable that several California ditaxis reference populations recorded in 2009 and 2010 along the gen-tie were revisited in 2016, and none of them keyed clearly to *D. serrata* var. *californica*, but keyed instead to *D. neomexicana*. Assuming that perennial plants and a viable seedbank of California ditaxis persists near previously documented records in 2010, then this species is presumed present on the gen-tie consistent with the quantities previously recorded. The potential for California ditaxis to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.2.4 Harwood's Eriastrum

Harwood's eriastrum (*Eriastrum harwoodii*), also commonly known as Harwood's phlox or woollystar, has a CRPR of 1B.2, has a NatureServe rank of G2/S2, and is a BLM sensitive species. This species is a spring annual and a California endemic with a global range restricted to San Diego, Riverside, and San Bernardino counties, typically in dunes associated with the margins around dry lakes such as Dale, Cadiz, and Soda lakes (CNPS 2016). Reports of this species are known from San Bernardino, Riverside, Imperial, San Diego, and Sonora, Mexico (CNPS 2016). There are 98 records of this species in California (CCH 2016). Surveys conducted in spring of 2010 for the Blythe Solar Power Project located this species primarily in the sandy areas south of I-10, where 2,134 plants were located and mapped. All of these plants were identified in the general vicinity of the proposed Southern California Edison Colorado River substation.

The PSPP PA/FEIS (Section 3.18) asserted that Harwood's eriastrum was not recorded within the PSPP disturbance area. Stabilized and partially stabilized dunes within the Project site were considered to be suitable habitat for this species (CEC 2010). During spring 2010 field surveys, over 150 Harwood's eriastrum plants were observed in the partially stabilized dunes outside of the Project site (between 0.5 mile and 1.5 miles to the east) (Figure 16). Harwood's eriastrum was not observed during a March 30, 2013 survey of the PSEGS' proposed linear modifications (Karl 2013a). This species was not observed in the 2016 surveys likely because of the lack of preceding winter rainfall. Offsite reference populations were successfully revisited in 2017 to confirm phenology prior to conducting formal surveys. During the 2017 surveys, 46 records of Harwood's eriastrum, consisting of approximately 940 individual plants in total, were identified within the Project site primarily within Zone II (Figure 16). Additional observations of Harwood's eriastrum were recorded incidentally within Zone I and II outside of the Project site during the

2017 surveys: 16 records consisting of approximately 867 individual plants in total. Suitable habitat for Harwood's eriastrum occurs within the un-surveyed portions of Zones I and II outside the Project site, where this species likely occurs in similar densities. Optimal growing conditions resulting from the above-average winter rainfall likely contributed to the number of observations in 2017.

In summary, stabilized and partially stabilized dune habitat, which is suitable for Harwood's eriastrum, was previously identified as occurring within the Project site as described in the PSPP PA/FEIS; however, Harwood's eriastrum was not observed within the Project site prior to 2017. In spring 2017, Harwood's eriastrum was found occupying approximately 50 acres of the Project site. Observations were located within and adjacent to mapped stabilized and partially stabilized dunes, primarily within Zone II; thus, the documented presence of Harwood's eriastrum within the Project site has changed from the description in the PSPP PA/FEIS.

4.2.5 Utah Milkvine

Utah milkvine (*Cynanchum utahense* [=*Funastrum utahense*]) has a CRPR of 4.2 and a NatureServe rank of G4/S4. This species occurs in San Diego, Imperial, Riverside, and San Bernardino counties and portions of Arizona, Nevada, and Utah (CNPS 2016). Utah milkvine is a twining perennial that occurs in sandy or gravelly soils in Mojavean and Sonoran desert scrub habitats or washes from approximately 500 feet to 4,300 feet in elevation (CNPS 2016). This species was documented on the Palo Verde Mesa (CEC 2010). There are 140 records of this species from the Consortium of California Herbaria database primarily from San Bernardino and San Diego counties; there is one record from the Big Maria Mountains from wash and stabilized dune habitat at approximately 1,200 feet elevation (CCH 2016).

The PSPP PA/FEIS (Section 3.18) asserted that Utah milkvine was not recorded within the PSPP disturbance area. Utah milkvine was not found during 2009 field surveys; however, this plant was observed incidentally at a single location east of Palen Lake and approximately 1.5 miles east of the Project site. Utah milkvine was not observed within the Project site or buffer area during 2009 or 2010 field surveys (Figure 16; Solar Millennium 2010d). Utah milkvine was not observed during March 2013 surveys of the PSEGS linear features (Karl 2013a). Due the absence of suitable habitat within the Project site and negative results of previous surveys, this species is not expected to occur within the Project site. The potential for Utah milkvine to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.2.6 Salton Saltbush (Palen Lake Saltbush)

During the 2010 botanical surveys, an undescribed variety of *Atriplex canescens* was found outside the Project site on the saline margins of Palen Lake. This taxon was provisionally named *Atriplex* sp. *nov*. This species has been observed in other saline (but non-playa) habitats on

remnants of the lower Colorado River flood plain (Andre, Silverman, pers. comm. 2010). It resembles the common four-wing saltbush (*Atriplex canescens* var. *linearis*), a common plant of dunes which has very linear leaves, but the new taxon has obovate leaves that distinguish it from all *Atriplex canescens* and its subspecies (Andre, pers. comm.). The "new" species was first collected in 2005 at the dry lake just northeast of the Interstate 15 and Highway 95 junction, approximately 35 miles east and northeast of Las Vegas, Nevada and the first voucher/observation of it in California was on the saline playa margins of Palen Dry Lake in 2009 by a botanist with the U.C. Reserve System (CEC 2010).

In 2012, a new edition of the *Jepson Manual of Vascular Plants of California* was published, which resurrected the taxon named *Atriplex canescens* var. *macilenta*, the Salton saltbush. These plants are distinguished by shorter stature, smaller fruits, and wider oblanceolate leaves, preference for saline habitat, polyploidy, and are probably of hybrid origin (Baldwin et al. 2012). The *Atriplex* sp. *nov.* plants observed outside the Project site appear to conform to this resurrected variety of *Atriplex canescens* var. *macilenta*. The California Consortium of Herbaria lists 20 occurrences of this taxon in Southern California (CCH 2016). Three occurrences are in Chuckwalla Valley including one that was collected on Palen Dry Lake in 2010 as part of the original surveys (D. Silverman, #7829, 24 March 2010 [UCR; CAS]). The plants observed during the spring 2016 survey also conform to this newly re-recognized variety. *Atriplex canescens* var. *macilenta* was first collected in California in 1912 near Calexico (CCH 2016). Since then it has been occasionally documented scattered across saline habitats in the Salton sink, Imperial Valley, Rice Valley, and Chuckwalla Valley (CCH 2016). There could be some taxonomic dispute about the accepted name of this saltbush; however, because the plants in the Chuckwalla Valley tend to conform to a recognized variety, *A. canescens* var. *macilenta*, this is likely the most parsimonious assignment of nomenclature. Given that a formal taxonomic analysis has yet to be performed, the conservative approach would be to consider this species as having special status, and the BLM State Botanist indicated in 2013 that potential new taxa may be treated as BLM Sensitive species (CEC 2010).

The PSPP PA/FEIS (Section 3.18) asserted that *Atriplex* sp. *nov.* was not recorded within the PSPP disturbance area. Several *Atriplex* sp. *nov.* plants were found within in the buffer area, northeast of the Project site during spring 2010 field surveys (Solar Millennium 2010d). No *Atriplex* sp. *nov.* were found within the Project site or gen-tie during the surveys conducted from 2009 through 2016. This species was relocated in April 2016, during reference site visits, where it was found flowering and fruiting, at the same locality as originally documented in 2010. It was not observed on the Project site during surveys performed in May 2016, likely due to lack of appropriate dry lakeshore habitat; therefore, this species is not expected to occur within the Project site. The potential for *Atriplex* sp. *nov.* to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.2.7 Spiny Abrojo

Spiny abrojo (*Condalia globosa* var. *pubescens*) has a CRPR rank of 4.2, a NatureServe rank of G5T4/S3, and is covered under NECO. This species is a spiny deciduous shrub in the buckthorn family known from gravelly soils in low elevations of Sonoran desert scrub. It is considered fairly endangered in California, but is apparently secure because of larger established populations in Arizona and Mexico. There are 24 CNDDB occurrence records for this shrub in California, most of which are in the Chocolate Mountains and Chuckwalla Bench of Imperial and Riverside counties. Scattered individuals have been documented elsewhere. The closest record to the project site is in the Corn Springs area south of I-10.

The PSPP PA/FEIS (Section 3.18) asserted that spiny abrojo was not recorded in the PSPP disturbance area. Spiny abrojo was not found during the 2009 to 2013 surveys. The majority of the Project site occurs below the elevation where this species typically occurs. A solitary shrub in the Rhamnaceae family about 1.75m tall, in sparsely leafing condition, was found in spring of 2016 in an open flat area about 0.3 miles inside the western site boundary Project site. Close reconnaissance of the surrounding area produced no additional occurrences, implying that this individual was probably a waif. This plant was not in identifiable condition during surveys in May 2016; it had barely leafed-out and held no flowers or fruits required for identification. Vegetative characters alone are insufficient for a clear determination. It was likely *Ziziphus obtusifolia* var. *canescens*, a more common low desert shrub with no rarity status. During the 2017 surveys, one location of spiny abrojo, consisting of three individual plants, was recorded along the gen-tie line approximately 800 feet west of the Red Bluff Substation, south of the I-10. The southern terminus of the gen-tie occurs at a higher elevation than all other project components and the isolated record of spiny abrojo likely occurs near the lower elevation limits of the species. The presence of this record indicates that the potential for spiny abrojo to occur within the Project site, specifically within the southernmost limits of the gen-tie, has changed from the description in the PSPP PA/FEIS.

4.2.8 Desert Unicorn Plant

Desert unicorn plant (*Proboscidea althaeifolia*) has a CRPR of 4.3 and a NatureServe rank of G5/S3.3. Its status indicates that it has limited distribution, but is not very threatened in California. This is a low-growing, perennial species that occurs in sandy washes within Sonoran desert scrub habitats in San Bernardino, Imperial, Riverside, and San Diego counties of California. There are 13 records known from the NECO planning area in Milpitas Wash, Chuckwalla Valley, and Chemehuevi Valley (BLM CDD 2002). This species has been identified in the region of other solar projects (CEC 2010). It is a late-season bloomer (May to August) but it has large and distinctive seed pods that can be detected during the spring season and fleshy root structure that can remain dormant in dry years (BLM 2011). There are 86 records in the

Consortium of California Herbaria, several of which are from the Chuckwalla Mountains and Desert Center area (CCH 2016).

The PSPP PA/FEIS (Section 3.18) asserted that desert unicorn plant was not recorded in the PSPP disturbance area. This species was not observed during 2009, 2010 (including late-season), 2016, or 2017 field surveys. The potential for desert unicorn plant to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.2.9 Abram's Spurge

Abram's spurge (*Chamaesyce abramsiana*) [=Euphorbia abramsiana] has a CRPR of 2B.2 and a NatureServe rank of G4/S2. It is not covered under the draft DRECP. This species is fairly rare in California but more common elsewhere (CNPS 2016). Abram's spurge is a late-season, ephemeral annual that responds to summer monsoonal rains, typically blooms from September through November following precipitation (greater than 0.10 inch), but dries quickly and cannot be detected during routine spring surveys (CEC 2010). Typical habitat consists of silty swales and flats in creosote bush scrub habitat from approximately 600 to 2,700 feet above mean sea level. This summer annual occurs in halophytic (saline-alkaline) scrub flats, playas, and along inlets and floodplains of playas and always seems to prefer the lower floodplain ecotone but can also extend higher up in the floodplain drainages (Silverman, pers. comm.). There are 121 records in the Consortium of California Herbaria from San Bernardino County to Imperial and eastern San Diego counties to Arizona, Nevada, Mexico, and Baja California (CCH 2016).

The PSPP PA/FEIS (Section 3.18) asserted that Abram's spurge was not recorded in the PSPP disturbance area. This species was not observed during 2009, 2010 (including late-season), 2016, or 2017 field surveys. The potential for Abram's spurge to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.2.10 Glandular Ditaxis

Glandular ditaxis (*Ditaxis claryana*) has a CRPR of 2B.2 and a NatureServe rank of G3G4/S2. It is rare in California, but more common elsewhere. This plant species grows from sea level to approximately 1,400 feet above mean sea level in Mojavean and Sonoran desert scrub habitat, in the sandy soils of dry washes and rocky hillsides. Glandular ditaxis (an annual or short-lived perennial) blooms from October through March (CNPS 2016); while it can be detected during spring surveys, it is easier to detect in fall following the start of the rainy season (Silverman pers. comm.). There are 43 occurrences in the Consortium of California Herbaria (CCH 2016), the nearest from the Arica Mountains, about 28 miles from the project site. CNDDB lists 26 occurrence elements, two within the general vicinity of the project (Corn Springs and Sidewinder Well quads).

The PSPP PA/FEIS (Section 3.18) asserted that glandular ditaxis was not recorded in the PSPP disturbance area. This species was not observed during 2009, 2010 (including late-season), 2016, or 2017 field surveys. The potential for glandular ditaxis to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.2.11 Lobed Ground Cherry

Lobed ground cherry (*Physalis lobata*) has a CRPR of 2B.3 and a NatureServe rank of G5/S1S2. It is a late season perennial that blooms from September to January (CNPS 2016). This species occurs in Mojavean desert scrub on decomposed granite soils, playas, and alkaline dry lake beds. This species occurs from approximately 1,500 feet to 2,400 feet above mean sea level. There are 36 occurrences in the Consortium of California Herbaria (CCH 2016), all to the north in Mojavean habitat. The nearest collection is approximately 29 miles northwest of the project site.

The PSPP PA/FEIS (Section 3.18) asserted that lobed ground cherry was not recorded in the PSPP disturbance area. This species was not observed during 2009, 2010 (including late-season), 2016, or 2017 field surveys. The potential for lobed ground cherry to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.2.12 Jackass Clover

Jackass clover (*Wislizenia refracta* ssp. *refracta*) has a CRPR of 2B.2 and a NatureServe rank of G5T5/S1. It is rare in California, but more common elsewhere. This species occurs in desert dunes, Mojavean desert scrub, playas, or Sonoran desert scrub and is commonly associated with sandy washes, roadsides, or alkaline flats, of elevations from 425 to 2,630 feet (CNDDB 2016). There are 29 occurrences in the Consortium of California Herbaria (CCH 2016). Jackass clover was also documented at several locations from the northern to southern end of Palen Lake in dune habitats during a detailed vegetation mapping and classification project conducted by CNPS Vegetation Program for BLM (Evens & Hartman 2007). The populations of jackass clover at Palen Lake are considered to be unique stands and are included in this analysis as a sensitive natural community (PSPP PA/FEIS 2010).

The PSPP PA/FEIS (Section 3.18) asserted that jackass clover was not recorded in the PSPP disturbance area. Jackass clover was not observed during spring 2009 or 2010 botanical surveys, or during fall surveys completed in October 2010 (CEC 2010; AECOM 2010). A reference population was observed flowering in Twentynine Palms in October 2010, but this locality is 50 miles northwest of the Project site, with different habitat and climatic characteristics. The potential for jackass clover to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

4.2.13 Palmer's Jackass Clover

Palmer's jackass clover (*Wislizenia refracta* ssp. *palmeri*) has a CRPR of 2B.2 and a NatureServe rank of G5T2T4/S1. Its status indicates that global populations of *Wislizenia refracta* are secure, but ssp. *palmeri* varies from imperiled to secure based on location and is considered critically imperiled in California. Palmer's jackass clover is a perennial herb that occupies sandy washes, and Sonoran desert scrub habitat from sea level to 650 feet. There are 29 occurrences in the Consortium of California Herbaria (CCH 2016).

The PSPP PA/FEIS (Section 3.18) asserted that Palmer's jackass clover was not recorded in the PSPP disturbance area. Palmer's jackass clover was not observed during spring 2009 or 2010 botanical surveys, or during fall surveys completed in October 2010; although the reference population on the Palen Sand Dunes near the BLM Desert Lily Sanctuary was observed flowering in October 2010 (CEC 2010; AECOM 2010). This species was not observed during 2009, 2010 (including late-season), and 2016 field surveys. The potential for Palmer's jackass clover to occur within the Project site has not changed from the description in the PSPP PA/FEIS.

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APPENDIX A

Special Status Wildlife Species

Species	Status State	Status Federal	Status WBWG	Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
REPTILES						
Agassiz's desert tortoise *Gapherus agassizii*	ST	FT	-	This species is widely distributed in the Mojave, Sonoran and Colorado deserts from below sea level to 2200 m (7220 ft) (Grover and DeFalco 1995). Most common in desert scrub, desert wash, and Joshua tree habitats, but occurs in almost every desert habitat except those on the most precipitous slopes. Desert tortoises occur in a wide variety of habitats in arid and semiarid regions. They require friable soil for burrow and nest construction. Highest densities are achieved in creosote bush communities with extensive annual wildflower blooms, such as occur in the western Mojave. However, tortoises can be found in areas of extensive lava formations, alkali flats and most other desert habitats.	Low to Moderate	Recent sign of desert tortoise was not detected (no live tortoises) within the proposed solar facility during 2016 surveys, where prior surveys detected only historical sign. The western extent of gen-tie likely supports occupied habitat based on the presence of recent, active sign in the vicinity.
Mojave fringe-toed lizard *Uma scaparia*	SSC	BLMS	-	It is restricted to fine, loose, wind-blown deposits in sand dunes, dry lakebeds, riverbanks, desert washes, sparse alkali scrub and desert shrub habitats. The CNDDB indicate 4 historic and 26 recent occurrences in Riverside County (CNDDB 2016).	High	Detected on site, with high potential to occur. There is suitable sand habitat with vegetative cover, which is typical of this species. Live individuals were observed on Project site, ranging from less dense in the mid-alluvial fan to denser in lower alluvial fan. Also present within the eastern extent of gen-tie.
AMPHIBIANS						
Couch's spadefoot toad *Scaphiopus couchii*	SSC	BLMS	-	This species frequents arid and semi-arid habitats of the southwest, occurring along desert washes, in desert riparian, palm oasis, desert succulent shrub, and desert scrub habitats. It is also found in cultivated cropland areas. It breeds in temporary pools within rocky streambeds, washes, at the edges of agricultural fields, in depressions adjacent to roads and railroad tracks, and cattle tanks. Pools of water need to persist for at least 7 to 8 days to facilitate eggs hatching and larvae fully transform. The CNDDB indicate 1 historic and 2 recent occurrences in Riverside County, all greater than 10 miles from the Project, near the Salton Sea and Colorado River (CNDDB 2016).	Low	Not expected to occur due to absence of essential breeding habitat and geographical distance from existing records. The Project site lacks potential for standing water. Washes onsite have high sand content and low silt and clay content, resulting in high percolation rates.

Species	Status			Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
	State	Federal	WBWG			
MAMMALS						
Colorado Valley woodrat *Neotoma albigula venusta*	-	-	-	Variety of habitats including low desert, pinyon-juniper woodlands, and desert-transition chaparral. Suitable habitat elements for this species include washes where organic debris gathers, areas of prickly pear cactus and mesquite, rocky areas, and crevices in boulders which are used for cover and nest sites. The CNDDB indicate 7 historic and 1 recent occurrence in Riverside Co. The nearest CNDDB occurrence is a 2001 record near Corn Springs campground, located approximately 5.1 miles south of the project and another on Pilot Mountain (CNDDB 2016).	Low	Not detected on site, with low potential to occur. Project site does not support typical rocky wash habitat.
Burro deer *Odocoileus hemionus eremicus*	CPGS	-	-	Occur in early to intermediate successional stages of most forest, woodland, and brush habitats. Prefer a mosaic of various-aged vegetation that provides woody cover, meadow and shrubby openings, and free water.	High	Detected on site, with high potential to occur. There is suitable foraging habitat on site. Scat and tracks observed primarily within dry wash woodland.
Desert bighorn sheep *Ovis canadensis nelsoni*	CFP	BLMS	-	Habitats used include alpine dwarf-shrub, low sage, sagebrush, bitterbrush, pinyon-juniper, palm oasis, desert riparian, desert succulent shrub, desert scrub, subalpine conifer, perennial grassland, montane chaparral, and montane riparian (DeForge 1980, Monson and Sumner 1980, Wehausen 1980). Use rocky, steep terrain for escape and bedding. Remain near rugged terrain while feeding in open habitat. The CNDDB indicate 8 historical, and 0 recent record in Riverside Co. (CNDDB 2016).	Low	Not detected on site, with low potential to occur. Project site greater than 3 miles from suitable mountainous habitat. Project site provides low intact value.

Species	Status State	Status Federal	Status WBWG	Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
Yuma mountain lion *Puma concolor browni*	SSC	-	-	In the NECO planning area, mountain lions primarily inhabit the low mountains and extensive wash systems in and around Chuckwalla Bench, Chuckwalla Mountains, Chocolate Mountains, Picacho Mountains, Milpitas Wash, Vinagre Wash, and other washes in that area. Mountain lions typically occur in habitat areas with extensive, well-developed riparian or shrubby vegetation interspersed with irregular terrain, rocky outcrops, and community edges. Mountain lions are restricted to the southern Colorado Desert from Joshua Tree National Park south and east to the Colorado River. Burro deer, the primary prey item, are known to spend the hot summer and fall in riparian areas along the Colorado River and in dense microphyll woodlands near the Coachella Canal.	Low to Moderate	Not detected on site, with low - moderate potential to occur. Project site provides suitable habitat and burrow deer (prey source) present on the Project site.
American badger *Taxidea taxus*	SSC	-	-	Suitable habitat for badgers is characterized by herbaceous, shrub, and open stages of most habitats with dry, friable soils. The CNDDB indicate 13 historic and 4 recent occurrences in Riverside Co. (CNDDB 2016).	High	Detected on site, with high potential to occur. There is suitable foraging habitat, and burrowing habitat on site.
Desert kit fox *Vulpes macrotis arsipus*	CPF	-	-	Lives in annual grasslands or grassy open stages of vegetation dominated by scattered brush, shrubs, and scrub. Cover provided by dens they dig in open, level areas with loose-textured, sandy and loamy soils.	High	Detected on site, with high potential to occur. Active dens/complexes with sign observed.
BATS						
Pallid bat *Antrozous pallidus*	SSC	BLMS	H	Inhabit low elevation (less than 6,000 feet) rocky, arid deserts and canyonlands, shrub/steppe grasslands. Day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees with exfoliating bark, and various human structures (WBWG, 2005). The CNDDB indicates there are 13 historical, and 2 recent records for this species in Riverside Co. The nearest CNDDB record is approximately 4.2 miles southeast of the project site (CNDDB 2016).	Foraging - Moderate Roosting - Low	Detected during Project acoustic sampling. Typical roosting habitat is not present within the Project site; however, roosting opportunities may exist outside the site in the Project vicinity.

Species	Status State	Status Federal	WBWG	Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
Townsend's big-eared bat *Corynorhinus townsendii*	SSC	BLMS	H	This species has been reported in a wide variety of habitat types ranging from sea level to approximately 9,000 feet above MSL. Habitat associations include coniferous forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal habitat types. Foraging associations include edge habitats along streams, adjacent to and within a variety of wooded habitats. The CNDDB indicate there are 9 historical, and 4 recent records in Riverside Co. (CNDDB 2016).	Foraging - Moderate Roosting - Low	Not detected during Project acoustic surveys; however, this species is difficult to detect with acoustic surveys due to low intensity echolocation signals. Typical roosting habitat is not present within the Project site.
Big brown bat *Eptesicus fuscus*	-	-	L	This widespread and abundant species has been recorded in virtually every North American vegetation type. Common to abundant in most of its range, the big brown bat is uncommon in hot desert habitats, and is absent only from the highest alpine meadows and talus slopes. Vagrant individuals may be seen in any habitat. Uses buildings and other human-made structures for roosting to such an extent that natural roosting habits are under documented.	Low	Not detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.
Spotted bat *Euderma maculatum*	SSC	BLMS	H	Arid, low desert habitats to high elevation conifer forests and prominent rock features appear to be a necessary feature for roosting.	Low	Not detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.
Western mastiff bat *Eumops perotis*	SSC	BLMS	H	Variety of habitats, from desert scrub to chaparral to oak woodland and into the ponderosa pine belt and high elevation meadows of mixed conifer forests. The nearest CNDDB record is approximately 4.2 miles southwest of the Project site (CNDDB 2016).	Low	Not detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.
Hoary bat *Lasiurus cinereus*	-	-	M	Highly associated with forested habitats in the west. Hoary bat roosts usually are located at the edge of a clearing, although more unusual roosting sites have been reported in caves, beneath rock ledges, woodpecker holes, squirrel nests, building sides, and in dried palm fronds on palm trees. The CNDDB indicate 5 historic, and 0 recent occurrences in Riverside Co. The closest CNDDB record is a historical 1919 occurrence approximately 23.6 miles east of the project area in the town of Neighbors. (CNDDB 2016).	Foraging - Moderate Roosting - Low	Not confirmed during Project acoustic surveys; several call sequences were associated with either hoary or pocketed free-tailed bats but lacked features for confirmation of species. Typical roosting habitat is not present within the Project site.

Species	Status State	Status Federal	Status WBWG	Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
Western yellow bat *Lasiurus xanthinus*	SSC	-	H	Recorded below 600 m (2000 ft) in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. This species occurs year-round in California. The CNDDB indicate 22 historic and 2 recent occurrences in Riverside Co. (CNDDB 2016).	Moderate	Detected during Project acoustic surveys at the artificial pond located near the date palm farm outside the northwestern boundary of the Project site. The Project site lacks typical foraging and roosting habitat; however, this species may be found on the Project site due to the proximity of the existing offsite date palm farm.
California leaf-nosed bat *Macrotus californicus*	SSC	BLMS	H	Deserts of California, southern Nevada, Arizona and south to northwestern Mexico. This species depends on either caves or mines for roosting habitat. All major maternity, mating, and overwintering sites are in mines or caves (BLM CDD, 2002). Radio-telemetry studies of *Macrotus* in the California desert show that the California leaf-nosed bat forage almost exclusively among desert wash vegetation within 10 km of their roost (WBWG, 2005). The CNDDB indicate 13 historic and 4 recent occurrences in Riverside Co. The nearest record is from 1993 near the McCoy Mountains area approximately 14.0 miles northwest of the project, in creosote bush scrub habitat where approximately 300 adults were observed roosting in 1993 and 100 were observed during in flight in 1997 (CNDDB 2016).	Low	Not detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.
California myotis *Myotis californicus*	-	-	L	Optimal habitats for this species include all desert, chaparral, woodland, and forest from sea level up through ponderosa pine, mixed conifer, and Jeffrey pine.	Foraging - Moderate Roosting - Low	Detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.
Arizona myotis *Myotis occultus*	SSC	-	-	Commonly known from conifer forests from 6,000 to 9,000 feet in elevation, although maternity roosts are known from much lower elevations including areas along the Colorado River in California. The CNDDB indicate 2 historic and 0 recent occurrence in Riverside Co. The closest record is a historical occurrence from 1945 approximately ten miles south of the Study Area near the town of Ripley.	Low	Not detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.

Species	Status			Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
	State	Federal	WBWG			
Cave myotis *Myotis velifer*	SSC	BLMS	M	Found primarily at lower elevations (the Sonoran and Transition life zones) of the arid southwest in areas dominated by creosote bush, palo verde, and cactus. This species is a "cave dweller" and caves are the main roosts although this species may also use mines, buildings, and bridges for roosts. The CNDDB indicate 3 historic and 4 recent occurrences in Riverside Co. The nearest CNDDB record for this species is from 2002 near the I-15 bridge over the Colorado River in Blythe where individual bats of this species were detected acoustically during April 2002 (CNDDB 2016).	Low	Not detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.
Yuma myotis *Myotis yumanensis*	-	BLMS	LM	Associated with permanent sources of water, typically rivers and streams, feeding primarily on aquatic emergent insects, but Yuma myotis also use tinajas (small pools in bedrock) in the arid west. It occurs in a variety of habitats including riparian, arid scrublands and deserts, and forests. The species roosts in bridges, buildings, cliff crevices, caves, mines, and trees. The CNDDB indicate 0 historic and 5 recent occurrences in Riverside Co. The nearest CNDDB record is from 2002 near the Blythe bridge over the Colorado River where individual bats of this species were detected acoustically during April 2002 (CNDDB 2016).	Low	Not detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.
Pocketed free-tailed bat *Nyctinomops femorosaccus*	SSC	-	M	Known to occur in the desert from March through August, when they then migrate out of the area. In California, they are found primarily in creosote bush and chaparral habitats in proximity to granite boulders, cliffs, or rocky canyons. The CNDDB indicate 7 historic and 2 recent occurrence in Riverside Co. The nearest CNDDB record for this species is from 2002 near the I-15 bridge over the Colorado River in Blythe. Individual bats of this species were detected acoustically during April 2002 (CNDDB 2016).	Low	Not detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.

Species	Status State	Status Federal	WBWG	Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
Big free-tailed bat *Nyctinomops macrotis*	SSC	-	MH	Found generally sea level to 8,000 feet in elevation. This species occurs in desert shrub, woodlands, and coniferous forests. It roosts mostly in the crevices of rocks although big free-tailed bats may roost in buildings, caves, and tree cavities. The CNDDB indicate 2 historic and 0 recent occurrence in Riverside Co. The nearest occurrences for this species in Riverside County are from the vicinity of Palm Springs and Joshua Tree National Park (CNDDB 2016).	Foraging - Moderate Roosting - Low	Detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.
Canyon bat *Parastrellus hesperus*	-	-	L	The canyon bat (once known as the western pipistrelle) is a common to abundant resident of deserts, arid grasslands, and woodlands. Occupies all desert, brush, grassland, and woodland habitats up through mixed conifer forests. The most abundant bat in desert regions. Common in arid brushlands, grasslands, and woodlands, and uncommon in conifer forests. This species is a yearlong resident in California.	Foraging - Moderate Roosting - Low	Detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.
Mexican free-tailed bat *Tadarida brasiliensis*	-	-	L	Overall, this species is common in California and may be locally abundant. All habitats up through mixed conifer forests are used, but open habitats such as woodlands, shrublands, and grasslands are preferred.	Foraging - Moderate Roosting - Low	Detected during Project acoustic surveys. Typical roosting habitat is not present within the Project site.
Birds						
Golden eagle (Nesting and wintering) *Aquila chrysaetos*	CFP, WL	BCC, BLMS	-	Typically rolling foothills, mountain areas, sage-juniper flats, desert. Nests on cliffs of all heights and in large trees in open areas. Rugged, open habitats with canyons and escarpments used most frequently for nesting. The CNDDB indicates there are 10 historical, and 6 recent detections within Riverside County, all greater than 10 miles from the Project site (CNDDB 2016).	Nesting/Wintering – Absent Foraging - Low	Surveys conducted in 5 separate years from 2010 to 2015 indicated no active nests within 10 miles of the Project site. The nearest suitable nesting habitat is approximately 3 miles from the proposed solar facility in the Palen Mts. The site may provide suitable foraging habitat; however, surveys indicate relatively few golden eagle observations near the Project and prey sources are limited. Eight eagle flight paths were recorded during the fall 2013 BUC surveys; one additional eagle was spotted incidentally, but no flight path was recorded; one (3rd year) eagle observation over the site was recorded during the spring 2013 eagle nest surveys; no other eagle observations were recorded at the site.

Species	Status			Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
	State	Federal	WBWG			
Short-eared owl (Nesting) *Asio flammeus*	SSC	-	-	Year-round residents in Northern California and may be found in other portions of California during wintering. Require open country that supports small mammal populations, and that also provides adequate vegetation to provide cover for nests. This includes salt- and freshwater marshes, irrigated alfalfa or grain fields, and ungrazed grasslands and old pastures. The CNDDB contained no records within Riverside County (CNDDB 2016).	Low	Detected in Project vicinity during avian surveys (3 observations in fall 2013). The Project site is not located within the geographic range for nesting habitat for this species. Short-eared owl is likely an uncommon migrant within the Project vicinity during the non-breeding season.
Western burrowing owl *Athene cunicularia hypugaea*	SSC	BCC, BLMS	-	A yearlong resident of open, dry grassland and desert habitats. Uses rodent or other burrows for roosting and nesting cover. In the Colorado Desert, western burrowing owls generally occur at low densities in scattered populations (BLM 2013).	High	Detected on site during wildlife and avian surveys. Western burrowing owl is likely a resident, in relatively low densities, within the Project vicinity. The Project site supports suitable foraging and nesting habitat. Focused surveys and subsequent habitat assessments indicate approximately 4 burrowing owls may occupy the proposed solar facility footprint. Suitable habitat is also found along the gen-tie line.
Redhead (Nesting) *Aythya americana*	SSC	-	-	During breeding season may be found along the Colorado River and Salton Sea. Also breeds locally in the Central Valley, coastal Southern California, eastern Kern County, and the Salton Sea. Nests in fresh emergent wetland bordering open water. The CNDDB contained no records within Riverside County (CNDDB 2016).	Low	Detected in Project vicinity during avian surveys (total of 16 observations in fall 2013); however, the Project site does not support typical foraging or nesting habitat. Occurrences are expected to be of migrants only.
Ferruginous hawk (Wintering) *Buteo regalis*	WL	BCC	-	Most common in grassland and agricultural areas in the southwest. Ferruginous hawks are found in open terrain from grasslands to deserts, and are usually associated with concentrations of small mammals. There are 3 historical and 9 recent CNDDB records for this species in Riverside County, and the nearest CNDDB record was more than 90 miles west of the project area (CNDDB 2016).	Moderate	Detected in Project vicinity during avian surveys (11 observations in fall 2013 and 3 in spring 2015). The DRECP species distribution model indicates low probability of suitable habitat within the Project site. The Project site does not support typical nesting habitat, is outside its typical nesting geographic range, and prey sources are limited. The site is within the non-breeding (wintering) range of this species.

Species	Status State	Status Federal	Status WBWG	Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
Swainson's hawk *Buteo swainsoni*	ST	BCC	-	Require large areas of open landscape for foraging, including grasslands and agricultural lands that provide low-growing vegetation for hunting and high rodent prey populations. Swainson's hawks typically nest in large native trees such as valley oak, cottonwood, walnut, and willow, and occasionally in nonnative trees, such as eucalyptus within riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, and on the edges of remnant oak woodlands. The CNDDB indicates there are 3 historical and 0 recent records for Riverside Co (CNDDB 2016).	Nesting - Low Migration - High	Regularly detected in groups during migration over the Project vicinity during avian surveys. The Project site is outside the current geographic range for nesting. The DRECP species distribution model indicates low probability of suitable habitat within the Project site.
Costa's hummingbird (Nesting) *Calypte costae*	-	BCC	-	Primary habitats are desert wash, edges of desert riparian and valley foothill riparian, coastal scrub, desert scrub, desert succulent shrub, lower-elevation chaparral, and palm oasis.	Moderate	Detected in the Project vicinity during avian surveys (total of 8 observations from 2013 to 2015). The Project site supports suitable foraging habitat and nesting habitat within desert scrub and microphyll woodlands.
Vaux's swift (Nesting) *Chaetura vauxi*	SSC	-	-	This species is not known to breed in Riverside County or elsewhere in Southern California. Vaux's swifts prefer to nest in the hollows formed naturally inside of large old conifer trees, especially snags, which are entirely lacking from the project site.	Nesting - Low Migration - High	Regularly detected during migration in the Project vicinity during avian surveys. The Project site is outside the current geographic range for nesting. Occurrences are expected to be of migrants only.
Mountain plover (Wintering) *Charadrius montanus*	SSC	BCC, BLMS	-	Mountain plover habitat includes short-grass prairie or their equivalents, and in southern California deserts are associated primarily with agricultural areas. The CNDDB indicate 1 historical, and 1 recent occurrence in Riverside Co (CNDDB 2016). The closest CNDDB (2016) record for this species is in Imperial County at the southern end of the Salton Sea.	Nesting - Low Migration - Moderate	Detected in the Project vicinity during avian surveys (6 observations in fall 2013). The Project site is outside the geographical range for nesting. This species may use the dry lakebed and nearby agricultural areas as winter habitat. The DRECP species distribution model indicates no suitable habitat within the Project site and depicts the agricultural land within Chuckwalla Valley as potential wintering habitat.
Black tern *Chlidonias niger*	SSC	-	-	Although restricted to freshwater habitats while breeding, can be fairly common on bays, salt ponds, river mouths, and pelagic waters in spring and fall migration (Grinnell and Miller 1944, Cogswell 1977).	Low	Detected in the Project vicinity during avian surveys (2 observations in fall 2013 and 1 in spring 2014). The Project site is outside the geographical range for nesting. Black tern is likely an uncommon migrant within the Project vicinity during the non-breeding season.

Species	Status State	Status Federal	Status WBWG	Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
Northern harrier (Nesting) *Circus cyaneus*	SSC	-	-	This species does not commonly breed in desert regions of California, where suitable habitat is limited, but winters broadly throughout California in areas with suitable habitat. Northern harriers forage in open habitats including deserts, pasturelands, grasslands, and old fields. The CNDDB indicate there is 1 historical, and 2 recent occurrence for this species in Riverside Co (CNDDB 2016). .	Nesting - Low Wintering/Migration - High	Regularly detected in the Project vicinity during avian surveys. Project site is outside the geographical range for nesting. The Project site supports suitable foraging habitat during wintering and migration.
Gilded flicker *Colaptes chrysoides*	SE	BCC, BLMS	-	Stands of giant cactus, Joshua tree, and riparian groves of cottonwoods and tree willows in warm desert lowlands and foothills. This species nests primarily in cactus, but also will use cottonwoods and willows of riparian woodlands. This species may be nearly extinct in California. The CNDDB indicate 5 historical, and 1 recent record from 2012 in Riverside Co (CNDDB 2016). The closest CNDDB records for this species are along the Colorado River.	Low	Not detected in the Project vicinity during avian surveys. Previous records are in close proximity to the Colorado River. Project site does not support typical foraging or nesting habitat.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	SE	FT, BCC, BLMS	-	Breeds along the major river valleys in southern and western New Mexico, and central and southern Arizona. In California, the western yellow-billed cuckoo's breeding distribution is now thought to be restricted to isolated sites in the Sacramento, Amargosa, Kern, Santa Ana, and Colorado River valleys.	Low	Not detected in the Project vicinity during avian surveys. The closest suitable habitat for this species is along the Colorado River approximately 35 miles to the east of the Project. Project site does not support suitable breeding or wintering habitat.
Black swift (Nesting) *Cypseloides niger*	SSC	BCC	-	Nests in moist crevice or cave on sea cliffs above the surf, or on cliffs behind, or adjacent to, waterfalls in deep canyons. Forages widely over many habitats. The CNDDB indicate there are 7 historical, and 0 recent records in Riverside Co (CNDDB 2016).	Low	Detected in the Project vicinity during avian surveys. The Project site is outside the geographical range for nesting. Black swift is likely an uncommon migrant within the Project vicinity during the non-breeding season.
Willow flycatcher (Nesting) *Empidonax traillii*	SE	-	-	All subspecies are State-listed and one subspecies (*E . t. extimus)* is Federal-listed. Most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows (Serena 1982). Common spring (mid-May to early June) and fall (mid-August to early September) migrant at lower elevations, primarily in riparian habitats throughout the state exclusive of the North Coast. The CNDDB indicate there are 3 historical, and 6 recent records in Riverside Co. all greater than 10 miles from the Project site (CNDDB 2016).	Low	Detected in the Project vicinity during avian surveys (6 observations in fall 2013). The Project site does not support typical foraging or nesting habitat. Occurrences are expected to be of migrants only.

Species	Status State	Status Federal	Status WBWG	Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
California horned lark *Eremaphila alpestris actia*	WL	-	-	A common to abundant resident in a variety of open habitats, usually where trees and large shrubs are absent. Found from grasslands along the coast and deserts near sea level to alpine dwarf-shrub habitat above treeline. In winter, flocks in desert lowlands and other areas augmented by winter visitants, many migrating from outside the state (Garrett and Dunn 1981). The CNDDB indicate there are 2 historical, and 17 recent records in Riverside Co. (CNDDB 2016).	High	Regularly detected in the Project vicinity during avian and wildlife surveys. The Project supports suitable foraging and nesting habitat for this species.
Prairie falcon (Nesting) *Falca mexicanus*	WL	BCC	-	Occurs in annual grasslands to alpine meadows, but associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. Typically nests cliffs and bluffs. The CNDDB indicates 30 historical occurrences in Riverside Co. (CNDDB 2016).	Nesting - Low Foraging - High	Regularly detected in the Project vicinity during avian surveys. The Project supports suitable foraging but lacks nesting habitat for this species. The DRECP species distribution model indicates low to moderate probability of suitable habitat within the Project site.
American peregrine falcon (Nesting) *Falca peregrinus anatum*	CFP	BCC	-	Rare in the arid southeast, but they occur and are suspected to breed in the lower Colorado River Valley. Peregrine falcons require open habitat for foraging, and prefer breeding sites near water. Nesting habitat includes cliffs, steep banks, dunes, mounds, and some human-made structures. There are no CNDDB records for Riverside County (CNDDB 2016).	Nesting - Low Foraging - Moderate	Detected in the Project vicinity during avian surveys (3 observations in fall 2013 and 2 in spring 2015). The Project supports suitable foraging but lacks nesting habitat for peregrine falcon.
Sandhill crane (Wintering) *Grus canadensis*	SSC	-	-	Breeds in open wetland habitats surrounded by shrubs or trees. They nest in marshes, bogs, wet meadows, prairies, burned-over aspen stands, and other moist habitats, preferring those with standing water. Outside of known wintering grounds, extremely rare except during migration over much of interior California.	Nesting - Low Migration - Moderate	Detected in the Project vicinity during avian surveys (6 groups of 57 observations in fall 2013); however, the Project site does not support typical foraging or nesting habitat. Occurrences are expected to be of migrants only.
Yellow-breasted chat (Nesting) *Icteria virens*	SSC	-	-	This species occupies shrubby riparian habitat with an open canopy, and will nest in non-native species, including tamarisk. The CNDDB indicate 7 historic, and 5 recent occurrences in Riverside Co., associated with the Salton Sea or the Colorado River (CNDDB 2016). The closest CNDDB records for this species are two 1986 records east of the project site at the Colorado River.	Low	Detected in the Project vicinity during avian surveys (1 observation in fall 2013). The Project site does not support typical foraging or nesting habitat. Occurrences are expected to be of migrants only.

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	State	Federal	WBWG			
Loggerhead shrike (Nesting) *Lanius ludovicianus*	SSC	BCC	-	Open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Highest density occurs in open-canopied valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, pinyon-juniper, juniper, desert riparian, and Joshua tree habitats. The CNDDB indicate 2 historic, and 32 recent occurrences in Riverside Co. (CNDDB 2016).	High	Regularly detected on site during wildlife and avian surveys. The Project site supports suitable foraging and nesting habitat.
Gila woodpecker *Melanerpes uropygialis*	SE	BCC, BLMS	-	In California, this species is found primarily along the Colorado River and in small numbers in Imperial County. In southeastern California, Gila woodpeckers formerly were associated with desert washes extending up to 1 mile from the Colorado River; however, their range may be expanding. The CNDDB indicate 12 historic and 1 recent occurrence (2008) in Riverside County (CNDDB 2016). The closest CNDDB record for this species is a 1986 record approximately 30 miles east of the project site at the Colorado River (CNDDB 2016). Another individual was documented by the USFWS at the Rio Mesa project site near the Colorado River in 2012.	Low	Not detected on site during focused suitability surveys for Gila woodpecker or within numerous small bird count stations within microphyll woodland. One observation was recorded greater than 1 mile from the Project site during avian surveys (fall 2013). The Project site does not support typical foraging or nesting habitat.
Elf owl *Micrathene whitneyi*	SE	BCC, BLMS	-	A very rarely seen spring and summer resident of the Colorado River Valley. West of the Colorado River, there are records at the oases of Cottonwood Springs and Corn Springs over 6 miles from the Project site. Nests in desert riparian habitat with cottonwood, sycamore, willow or mesquite; absent from desert riparian habitat dominated by saltcedar. The CNDDB indicates 5 historic and 2 recent occurrence in Riverside County (CNDDB 2016).	Low	Not detected on site, or in the Project vicinity, during focused suitability surveys for elf owl or within numerous small bird count stations within microphyll woodland. The Project site does not support typical foraging or nesting habitat.
Long-billed curlew (Nesting) *Numenius americanus*	WL	BCC	-	Preferred breeding and winter habitats include large coastal estuaries, upland herbaceous areas, and croplands. On estuaries, feeding occurs mostly on intertidal mudflats.	Nesting - Low Migration - Moderate	Detected in the Project vicinity during avian surveys (15 observations from 2013 to 2015); however, the Project site does not support typical foraging or nesting habitat. Occurrences are expected to be of migrants only.

Species	Status			Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
	State	Federal	WBWG			
Lucy's warbler (Nesting) *Oreothlypis luciae*	SSC	BCC, BLMS	-	An uncommon to common, summer resident and breeder along the Colorado River, fairly common locally in a few other desert areas, and rare near Salton Sea. It occurs in desert wash and desert riparian habitats, especially those dominated by mesquite; also ranges into saltcedar and other thickets. May use abandoned verdin nests.	Moderate	Detected in the Project vicinity during avian surveys (2 observations in fall 2013). The Project site does not support typical nesting habitat (mesquite thickets), but the microphyll woodland may have a moderate potential to serve as nesting habitat.
American white pelican (Nesting colony) *Pelecanus erythrorhynchos*	SSC	-	-	Common spring and fall migrant at Salton Sea and Colorado River. Migrant flocks pass overhead almost any month, but mainly in spring and fall throughout the state, especially in southern California (Cogswell 1977, McCaskie et al. 1979, Garrett and Dunn 1981).	Nesting/Wintering – Low Migration - Moderate	Detected in the Project vicinity during avian surveys (42 observations from 2013 to 2015); however, the Project site does not support typical foraging, wintering, or nesting habitat. Occurrences are expected to be of migrants only.
Black-tailed gnatcatcher *Polioptila melanura*	WL	-	-	A year-round resident in southwestern United States and central and northern Mexico, in California the black-tailed gnatcatcher is found in the southeast desert wash habitat from Palm Springs and Joshua Tree National Park south, and along the Colorado River. It is now rare in eastern Mojave Desert north to the Amargosa River, Inyo County. This species nests primarily in wooded desert wash habitat, but also occurs in creosote scrub habitat during the non-breeding season. The CNDDB indicate 14 historic and 4 recent occurrences in Riverside County (CNDDB 20176).	High	Detected in the Project vicinity during avian surveys (174 observations from 2013 to 2015). The Project site supports suitable foraging and nesting habitat. Black-tailed gnatcatchers have beedn recorded nesting within the site, primarily associated with larger trees within microphyll woodlands.
Vesper sparrow *Pooecetes gramineus*	SSC	-	-	Fairly common locally in southern deserts in winter and during migration. Occupies grasslands, croplands, and open brushlands in winter.	Low	One observation was incidentally recorded in spring 2013 approximately 1,200 feet north of the Project site. The Project site does not support typical wintering or nesting habitat.
Purple martin *Progne subis*	SSC	-	-	The historical breeding range of the purple martin includes southern California, though populations have shrunk dramatically. Neither the historical or current breeding range, however, includes the Colorado Desert. Purple martins habitat requirements include adequate nest sites and availability of large aerial insects, and therefore are most abundant near wetlands and other water sources. The CNDDB indicate 6 historic and 0 recent occurrence in Riverside County (CNDDB 2016). .	Low	One observation was recorded in fall 2013. The Project site does not support typical wintering or nesting habitat. Occurrences are expected to be of migrants only.

Species	Status State	Status Federal	Status WBWG	Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
Vermilion flycatcher (Nesting) *Pyrocephalus rubinus*	SSC	-	-	They are usually found near water in arid scrub, farmlands, parks, golf courses, desert, savanna, cultivated lands, and riparian woodlands; nesting substrate includes cottonwood, willow, and mesquite. The CNDDB indicate 7 historic and 0 recent occurrence in Riverside County (CNDDB 2016). The closest record includes a 1983 record from the Blythe golf course.	Low	Not detected on site during wildlife or avian surveys. The Project site does not support typical habitat for this species. Occurrences are expected to be of migrants only.
Ridgway's clapper rail *Rallus obsoletus yumanensis*	ST, CFP	FE	-	Formerly Yuma clapper rail, it occurs in inland areas in the southwestern United States. This subspecies is partially migratory, with many birds wintering in brackish marshes along the Gulf of California. Some remain on their breeding grounds throughout the year; for example, the Salton Sea (south) Christmas Bird Count frequently records this species in the fresh-water marshes in and around the Imperial Wildlife Area (Wister Unit). Nesting and foraging habitat occurs only along the Lower Colorado River (from Topock Marsh southward) and around the Salton Sea.	Low	Not detected on site during wildlife or avian surveys. There is no suitable foraging habitat, and no nesting habitat on site. Nearest records are associated with the Salton Sea and Colorado River, both approximately 35 miles from the Project site. A clapper rail was detected at the Desert Sunlight Solar Farm, approximately 10 miles northwest of the Project site.
Bank swallow (Nesting) *Riparia riparia*	ST	BLMS	-	A neotropical migrant found primarily in riparian and other lowland habitats in California west of the deserts during the spring-fall period. Uses holes dug in cliffs and river banks for cover. Will also roost on logs, shoreline vegetation, and telephone wires.	Nesting/Wintering – Low Migration - Moderate	Detected in the Project vicinity during avian surveys (52 observations from 2013 to 2015). The Project site is outside the geographical range for nesting. Bank swallow is likely a relatively common migrant within the Project vicinity during the non-breeding season.
Sonora Yellow warbler (Nesting) *Setophaga petechia*	SSC	BCC	-	In southeastern California, this species is known only from the lower Colorado River Valley from the middle of San Bernardino County through Riverside and Imperial Counties. This species commonly uses wet, deciduous thickets for breeding, and seeks a variety of wooded, scrubby habitats in winter. The CNDDB indicate 2 historic and 0 recent occurrence in Riverside County (CNDDB 2016). The closest extant CNDDB records for this species are two 1986 records 35 miles east of the project site at the Colorado River.	Nesting - Low Migration - Moderate	Detected in the Project vicinity during avian surveys (7 observations from 2013 to 2015). The Project site is outside the typical geographical range for nesting, which is primarily associated with the Colorado River. Occurrences are expected to be of migrants only.

Species	Status State	Status Federal	Status WBWG	Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
Lawrence's goldfinch (Nesting) *Spinus lawrencei*	-	BCC	-	Highly erratic and localized in occurrence. Rather common along western edge of southern deserts. Breeds in open oak or other arid woodland and chaparral, near water. Typical habitats in southern California include desert riparian, palm oasis, pinyon-juniper, and lower montane habitats. The CNDDB indicate 0 historic and 2 recent occurrences in Riverside County, both greater than 10 miles from the Project site.	Low	One observation was recorded in fall 2013. The Project site does not support typical wintering or nesting habitat. Occurrences are expected to be of migrants only.
Bendire's thrasher *Toxostoma bendirei*	SSC	BCC, BLMS	-	Favors open grassland, shrubland, or woodland with scattered shrubs, primarily in areas that contain large cholla, Joshua tree, Spanish bayonet, Mojave yucca, palo verde, mesquite, catclaw, desert-thorn, or agave. The CNDDB indicate 14 historical, and 3 recent record in Riverside County, two records are located within 7 miles of the site near Desert Center (CNDDB 2016).	Low	Not detected on site during wildlife or avian surveys. The Project site does not support typical habitat for this species. Occurrences are expected to be of migrants only.
Crissal thrasher *Toxostoma crissale*	SSC	-	-	This species prefers habitats characterized by dense, low scrubby vegetation, which, at lower elevations, includes desert and foothill scrub and riparian brush. The CNDDB indicate 14 historic and 22 recent occurrences in Riverside County (CNDDB 2016). The closest occurrence based on the CNDDB is from 1977 and is approximately 14.2 miles south of the project site.	Low	One observation was recorded in fall 2013. The Project site does not support typical wintering or nesting habitat. Occurrences are expected to be of migrants only.
Le Conte's thrasher *Toxostoma lecontei*	SSC	-	-	Occurs primarily in open desert wash, desert scrub, alkali desert scrub, and desert succulent shrub habitats; also occurs in Joshua tree habitat with scattered shrubs. The CNDDB indicate 16 historic and 34 recent occurrences in Riverside County (CNDDB 2016).	High	Detected in the Project vicinity during avian surveys (57 observations from 2013 to 2015). The Project site supports suitable foraging and nesting habitat. Le Conte's thrashers have been recorded nesting within the site, primarily associated with larger trees within microphyll woodlands.

Species	Status			Habitat Requirements, Geographic Range, Regional Occurrence Records	Potential to Occur on Project Site	Comments
	State	Federal	WBWG			
Bell's vireo *Vireo bellii* Arizona bell's vireo *V. b. arizonae* least Bell's vireo *V. b. pusillus*	 SE SE	 BCC, BLMS FE	 - -	Subspecies *V. b. pusillus* (endemic to California and northern Baja California and state-listed and federal-listed) and subspecies *V. b. arizonae* are State-listed. Bell's vireo is now a rare, local, summer resident below about 600 m (2000 ft) in willows and other low, dense valley foothill riparian habitat and lower portions of canyons mostly in San Benito and Monterey cos.; in coastal southern California from Santa Barbara Co. south; and along the western edge of the deserts in desert riparian habitat. The CNDDB indicate 14 historic and 92 recent occurrences in Riverside County, all greater than 30 miles from the Project site (CNDDB 2016).	Low	One observation was recorded in fall 2013 during avian surveys. The Project site does not support typical wintering or nesting habitat. Occurrences are expected to be of migrants only.
Yellow-headed blackbird (Nesting) *Xanthocephalus xanthocephalus*	SSC	-	-	Nests in fresh emergent wetland with dense vegetation and deep water, often along borders of lakes or ponds. Forages in emergent wetland and moist, open areas, especially cropland and muddy shores of lacustrine habitat. Occurs as a migrant and local breeder in deserts. The CNDDB indicate 1 historic and 2 recent occurrences in Riverside County, over 30 miles from the Project site (CNDDB 2016).	Low	Detected in the Project vicinity during avian surveys (6 observations from 2013 to 2015). The Project site does not support typical wintering or nesting habitat. Occurrences are expected to be of migrants only.

APPENDIX B

Cumulative Wildlife Compendium

2009 to 2016

Common Name	*Scientific Name*
Avian	
American avocet	*Recurvirostra americana*
American coot	*Fulica americana*
American goldfinch	*Spinus tristis*
American kestrel	*Falco sparverius*
American pipit	*Anthus rubescens*
American white pelican	*Pelecanus erythrorhynchos*
American wigeon	*Anas americana*
Anna's hummingbird	*Calypte anna*
Ash-throated flycatcher	*Myiarchus cinerascens*
Audobon's cottontail	*Sylvilagus audubonii*
Bank swallow	*Riparia riparia*
Barn swallow	*Hirundo rustica*
Bell's sparrow	*Artemisiospiza belli*
Bell's vireo	*Vireo bellii*
Belted kingfisher	*Ceryle alcyon*
Bewick's wren	*Thryomanes bewickii*
Black phoebe	*Sayornis nigricans*
Black tern	*Chlidonias niger*
Black-bellied plover	*Pluvialis squatarola*
Black-capped gnatcatcher	*Polioptila nigriceps*
Black-chinned hummingbird	*Archilochus alexandri*
Black-headed grosbeak	*Pheucticus melanocephalus*
Black-necked stilt	*Himantopus mexicanus*
Black-tailed gnatcatcher	*Polioptila melanura*
Black-throated gray warbler	*Setophaga nigrescens*
Black-throated sparrow	*Amphispiza bilineata*
Blue grosbeak	*Guiraca caerulea*
Blue-gray gnatcatcher	*Polioptila caerulea*
Blue-winged teal	*Anas discors*
Bonaparte's gull	*Chroicocephalus philadelphia*
Brewer's sparrow	*Spizella breweri*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown-headed cowbird	*Molothrus ater*
Bufflehead	*Bucephala albeola*
Bullock's oriole	*Icterus bullockii*
Burrowing owl	*Athene cunicularia*
Cactus wren	*Campylorhynchus brunneicapillus*
California gull	*Larus californicus*

Common Name	Scientific Name
California horned lark	*Eremophila alpestris*
California quail	*Callipepla californica*
Canvasback	*Aythya valisineria*
Cassin's Finch	*Haemorhous cassinii*
Cassin's kingbird	*Tyrannus vociferans*
Cassin's vireo	*Vireo cassinii*
Cattle egret	*Bubulcus ibis*
Chipping sparrow	*Spizella passerina*
Cinnamon teal	*Anas cyanoptera*
Clark's grebe	*Aechmophorus clarkii*
Cliff swallow	*Petrocheliodon pyrrhonota*
Common goldeneye	*Bucephala clangula*
Common Raven	*Corvus corax*
Common yellowthroat	*Geothlypis trichas*
Cooper's hawk	*Accipiter cooperii*
Costa's Hummingbird	*Calypte costae*
Crissal thrasher	*Toxostoma crissale*
Dark-eyed junco	*Junco hyemalis*
Double-crested cormorant	*Phalacrocorax auritus*
Dunlin	*Calidris alpina*
Eared grebe	*Podiceps nigricollis*
Eurasian collared-dove	*Streptopelia decaocto*
European starling	*Sturnus vulgaris*
Ferruginous hawk	*Buteo regalis*
Forster's tern	*Sterna forsteri*
Gadwall	*Anas strepera*
Gambel's quail	*Callipepla gambelii*
Gila woodpecker	*Melanerpes uropygialis*
Golden eagle	*Aquila chrysaetos*
Gray flycatcher	*Empidonax wrightii*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Greater roadrunner	*Geococcyx californianus*
Greater scaup	*Aythya marila*
Greater yellowlegs	*Tringa melanoleuca*
Great-tailed grackle	*Quiscalus mexicanus*
Green heron	*Butorides virescens*
Green-winged teal	*Anas crecca*
Hammond's flycatcher	*Empidonax hammondii*
Hermit thrush	*Catharus guttatus*

Common Name	Scientific Name
Hermit warbler	*Dendroica occidentalis*
Herring gull	*Larus argentatus*
Hooded merganser	*Lophodytes cucullatus*
Hooded oriole	*Icterus cucullatus*
Horned lark	*Eremophila alpestris*
House finch	*Haemorhous mexicanus*
House sparrow	*Passer domesticus*
House wren	*Troglodytes aedon*
Killdeer	*Charadrius vociferus*
Ladder-backed woodpecker	*Picoides scalaris*
Lark sparrow	*Chondestes grammacus*
Laughing gull	*Leucophaeus atricilla*
Lawrence's goldfinch	*Spinus lawrencei*
Lazuli bunting	*Passerina amoena*
Le Conte’s thrasher	*Toxostoma lecontei*
Least sandpiper	*Calidris minutilla*
Lesser goldfinch	*Spinus psaltria*
Lesser nighthawk	*Chordeiles acutipennis*
Lesser scaup	*Aythya affinis*
Lesser yellowlegs	*Tringa flavipes*
Lincoln's sparrow	*Melospiza lincolnii*
Little gull	*Hydrocoloeus minutus*
Loggerhead shrike	*Lanius ludovicianus*
Long-billed curlew	*Numenius americanus*
Long-billed dowitcher	*Limnodromus scholopaceus*
Long-eared owl	*Asio otus*
Long-tailed duck	*Clangula hyemalis*
Lucy's warbler	*Oreothlypis luciae*
MacGillivray's warbler	*Geothlypis tolmiei*
Mallard	*Anas platyrhynchos*
Marbled godwit	*Limosa fedoa*
Merlin	*Falco columbarius*
Mew gull	*Larus canus*
Mexican duck	*Anas diuzi*
Mountain plover	*Charadrius montanus*
Mourning dove	*Zenaida macroura*
Mule deer	*Odocoileus hemionus*
Nashville warbler	*Oreothlypis ruficapilla*
Northern flicker	*Colaptes auratus*
Northern harrier	*Circus cyaneus*

Common Name	*Scientific Name*
Northern mockingbird	*Mimus polyglottos*
Northern pintail	*Anas acuta*
Northern roughwinged swallow	*Stelgidopteryx serripennis*
Northern shoveler	*Anas clypeata*
Northern waterthrush	*Parkesia noveboracensis*
Olive-sided flycatcher	*Contopus cooperi*
Orange-crowned warbler	*Oreothlypis celata*
Osprey	*Pandion haliaetus*
Pacific-slope flycatcher	*Empidonax difficilis*
Painted bunting	*Passerina ciris*
Pectoral sandpiper	*Calidris melanotos*
Peregrine falcon	*Falco peregrinus*
Phainopepla	*Phainopepla nitens*
Pied-billed grebe	*Podilymbus podiceps*
Pine siskin	*Spinus pinus*
Prairie falcon	*Falco mexicanus*
Purple martin	*Progne subis*
Raven	*Corvus corax*
Red tailed hawk	*Buteo jamaicensis*
Red-breasted merganser	*Mergus serrator*
Redhead	*Aythya americana*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged Blackbird	*Agelaius phoeniceus*
Ring-billed gull	*Larus delawarensis*
Ring-necked duck	*Aythya collaris*
Rock wren	*Salpinctes obsoletus*
Rose-breasted grosbeak	*Pheucticus ludovicianus*
Ross' goose	*Chen rossii*
Ruby-crowned kinglet	*Regulus calendula*
Ruddy duck	*Oxyura jamaicensis*
Rufous hummingbird	*Selasphorus rufus*
Sage thrasher	*Oreoscoptes montanus*
Savannah sparrow	*Passerculus sandwichensis*
Say's phoebe	*Sayornis saya*
Semipalmated plover	*Charadrius semipalmatus*
Semipalmated sandpiper	*Calidris pusilla*
Sharp-shinned hawk	*Accipiter striatus*
Short-billed dowitcher	*Limnodromus griseus*
Short-eared owl	*Asio flammeus*

Common Name	*Scientific Name*
Snow goose	*Chen caerulescens*
Snowy egret	*Egretta thula*
Snowy plover	*Charadrius nivosus*
Solitary sandpiper	*Tringa solitaria*
Song sparrow	*Melospiza melodia*
Spotted sandpiper	*Actitis macularius*
Swainson's hawk	*Buteo swainsoni*[2]
Swainson's thrush	*Catharus ustulatus*
Swamp sparrow	*Melospiza georgiana*
Townsend's warbler	*Setophaga townsendi*
Tree swallow	*Tachycineta bicolor*
Turkey vulture	*Cathartes aura*
Vaux's swift	*Chaetura vauxi*
Verdin	*Auriparus flaviceps*
Violet green swallow	*Tachycineta thalassina*
Warbling vireo	*Vireo gilvus*
Western grebe	*Aechmophorus occidentalis*
Western kingbird	*Tyrannus verticalis*
Western meadowlark	*Sturnella neglecta*
Western sandpiper	*Calidris mauri*
Western tanager	*Piranga ludoviciana*
Western wood-pewee	*Contopus sordidulus*
Whimbrel	*Numenius phaeopus*
White-crowned sparrow	*Zonotrichia leucophrys*
White-faced Ibis	*Plegadis chihi*
White-tailed kite	*Elanus leucurus*
White-throated swift	*Aeronautes saxatalis*
White-winged dove	*Zenaida asiatica*
Willet	*Tringa semipalmata*
Willow flycatcher	*Empidonax traillii*
Wilson's warbler	*Wilsonia pusilla*
Wilson's phalarope	*Phalaropus tricolor*
Wilson's snipe	*Gallinago delicata*
Wilson's warbler	*Cardellina pusilla*
Yellow rumped warbler	*Setophaga coronata*
Yellow warbler	*Dendroica petechia*
Yellow-breasted chat	*Icteria virens*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Yellow-rumped warbler	*Dendroica coronata*
Zone-tailed hawk	*Buteo albonotatus*

Common Name	*Scientific Name*
Invertebrate	
Ant lion	*Myrmeleontidae sp.*
Black harvester ant	*Messor pergandei*
California harvester ant	*Pogonomyrmex californicus*
Checkered white	*Pontia protodice*
Dainty sulphur	*Nathalis iole*
Darkling beetle	*Eleodes sp.*
Desert ironclad beetle	*Asbolus verrucosus*
Desert leafcutter ant	*Acromyrmex versicolor*
Forelius ant	*Forelius sp.*
Formica ant	*Formica sp.*
Giant sand treader cricket	*Macrobaenetes sp.*
Green lacewing	*Chrysopa sp.*
Honey bee	*Apis mellifera*
Marine blue butterfly	*Leptotes marina*
Painted lady	*Vanessa cardui*
Palo verde beetle	*Derobrachus geminatus*
Pigmy blue	*Brephidium exilis*
Red harvester ant	*Pogonomyrmex sp.*
Tarantula hawk	*Pepsis chrysothemis*
Thread-waisted wasp	*Ammophila sp.*
Velvet ant	*Dasymutilla sp.*
Virginia lady	*Vanessa virginiensis*
White-lined sphinx moth	*Hyles lineata*
Wind scorpion	*Solifugae sp.*
Mammal	
American badger	*Taxidea taxus*
Antelope ground squirrel	*Ammospermophilus leucurcus*
Big free-tailed bat	*Nyctinomops macrotis*
Black-tailed jackrabbit	*Lepus californica*
Bobcat	*Lynx rufus*
Burro deer	*Odocoileus hemionus*
California myotis	*Myotis californicus*
Canyon bat	*Parastrellus hesperus*
Coyote	*Canis latrans*
Desert kangaroo rat	*Dipodomys deserti*
Desert kit fox	*Vulpes macrotis*
Domestic dog	*Canis familiaris*
Merriam's kangaroo rat	*Dipodomys merriami*
Mexican free-tailed bat	*Tadarida brasiliensis*

Common Name	*Scientific Name*
Pallid bat	*Antrozous pallidus*
Pocket mouse species	*Perognathus longimembris*
Pocket mouse species	*Chaetodipus sp.*
Round tailed ground squirrel	*Xerospermophilus tereticaudus*
Western mastiff bat	*Eumops perotis*
Western yellow bat	*Lasiurus xanthinus*
Western yellow bat	*Lasiurus xanthinus*
Reptile	
Desert horned lizard	*Phrynosoma platyrhinos*
Desert iguana	*Dipsosaurus dorsalis*
Desert spiny lizard	*Sceloporus magister*
Desert tortoise	*Gopherus agassizii*
Glossy snake	*Arizona elegans*
Long-nosed leopard lizard	*Gambelia wislizenii*
Long-tailed brush lizard	*Urosaurus graciosus*
Mojave fringe toed lizard	*Uma scoparia*
Ornate tree lizard	*Urosaurus ornatus*
Patch-nosed snake	*Salvadora hexalepis*
Side blotched lizard	*Uta stansburyana*
Sidewinder	*Crotalus cerastes*
Western banded gecko	*Coleonyx variegates*
Western shovel-nosed snake	*Chionactis occipitalis*
Western whiptail lizard	*Aspidoscelis tigris*
Zebra tail lizard	*Callisaurus draconoides*

APPENDIX C

Special Status Plant Species

Species	Latin Name	Habitat Requirements, Geographic Range, Occurrence Records	Potential to Occur on Project Site
Angel trumpets	*Acleisanthes longiflora*	This species occurs in Sonoran desert scrub on carbonate soils from approximately 200 to 300 feet above MSL. There is only 1 CNDDB element occurrence from the Palo Verde area, approximately 35 miles east of the project (CNPS 2016). There are 5 records from the Consortium of California Herbaria from the Colorado Desert, the closest two are likewise from the Palo Verde area (CCH 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. The elevation range of the project site is appropriate for this species, but the BRSA does not support carbonate/limestone derived soils.
Argus (=Darlington's) blazing star	*Mentzelia puberula*	This species occurs in desert scrub and desert woodlands with limestone and granitic slopes above 2,000 feet in elevation, with 11 CNDDB occurrences (CNPS 2016). Based on 49 Consortium of California Herbaria database records, this species has been collected from Riverside, San Bernardino, and Imperial Counties, the nearest record from the Coxcomb Mountains northwest of the project site (CCH 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. This species is not expected to occur in the BRSA due to lack of limestone and granitic slopes, which are soil types and terrain preferred by this species. The project site is located at approximately 130 to 200 feet above MSL, which is well below the typical elevation where this species typically occurs.
Arizona spurge	*Euphorbia (Chamaesyce) arizonica*	This species occupies sandy areas in Sonoran desert scrub and has been reported from Imperial, Riverside, and San Diego Counties and portions of Arizona and Baja California (CNPS 2016) from approximately 150 feet to 1,200 feet above MSL. There are 12 database records from the Consortium of California Herbaria primarily from San Diego County but also from Riverside County often from sandy areas and transition areas between chaparral and desert habitats. The closest record is from the Salton sea, approximately 34 miles southwest of the project (CCH 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. This species has a low potential to occur within Sonoran creosote bush scrub habitats and sandy area within the project area.
Flat-seeded spurge	*Euphorbia (Chamaesyce) platysperma*	This species occurs in desert dunes and Sonoran desert scrub habitat types, in sandy places or shifting dunes, at elevations from approximately 200 to 300 feet. This ephemeral summer annual blooms February through September (CNPS 2016). There are 4 records in the Consortium of California Herbaria from San Bernardino County to Imperial and eastern San Diego counties to Arizona, Nevada, Mexico, and Baja California (CCH 2016), all of them "historical" (i.e., pre-1964). There are five CNDDB and Consortium of California Herbaria records of this species for the entire state of California, only one of which is from Riverside County; the closest occurrences are approximately 50 miles away. Of the total five occurrences in California, one of these are protected under State Park ownership and three are historical records and none of these occurrences have documented threats (CEC 2010).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Although there are no documented nearby occurrences, the Project site occurs within its range, suitable habitat is present, and as an ephemeral summer annual it may be under-surveyed (LaDoux pers. comm.). Potential of occurrence on the project site and gen-tie remains low, but recommendation is to resurvey in fall 2016 after sufficient summer monsoonal rainfall, emphasizing sandy habitats.

Species	Latin Name	Habitat Requirements, Geographic Range, Occurrence Records	Potential to Occur on Project Site
Bitter hymenoxys	*Hymenoxys odorata*	Bitter hymenoxys grows in riparian scrub and Sonoran desert scrub from 150 feet to 500 feet above MSL. This species blooms from February through November (CNPS 2016). Based on 37 records from the Consortium of California Herbaria, this species has been collected from Riverside, San Bernardino, and Imperial Counties. Riverside records are from the Palo Verde Valley, and from locales surrounding Blythe (CCH 2016). There are six CNDDB records for this species for the entire State of California, two of which occur in Riverside County; the nearest CNDDB occurrence is a historical record approximately 28.7 miles southeast of the Project Area from sandy slope, low bottom lands and overflow flats (CNPS 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. This species prefers mesic situations near seasonal watercourses, but has a low potential to occur within desert dry wash woodland, unvegetated washes, and Sonoran creosote bush scrub habitats within the project area.
California ayenia	*Ayenia compacta*	This species occurs in Mojavean and Sonoran desert scrub from approximately 500 to 3,300 feet above MSL. This species blooms from March through April. There are 123 records from the Consortium of California Herbaria database, the closest being about 7 miles distant (CCH 2016). The nearest CNDDB occurrence is a historical record from 1976 approximately 7.4 miles southwest of the project area in the Chuckwalla Mountains (CNPS 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. This species has a low potential to occur within Sonoran creosote bush scrub and desert wash habitats within the project area, but prefers higher elevations and rockier terrain.
California satintail	*Imperata brevifolia*	This species occurs in grassy areas found near chaparral, desert scrub, riparian scrubs, coastal scrub, wet springs, meadows, stream sides and floodplains from sea level to approximately 1,500 feet above MSL. The nearest CNDDB occurrence is from agriculture fields near Blythe (CNPS 2016). There are 107 records from the Consortium of California Herbaria database scattered across California in many different habitats. Records from Riverside County are from the Palm Springs, San Jacinto Mountains, and San Bernardino Mountains area along irrigation ditches or streams (CCH 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. California satintail has a low potential to occur within the PSEGS BRSA due to the lack of suitable habitat (mesic situations).

Species	Latin Name	Habitat Requirements, Geographic Range, Occurrence Records	Potential to Occur on Project Site
Chaparral sand verbena	*Abronia villosa var. aurita*	This species occupies sandy soil areas of chaparral, coastal sage scrub, and sandy desert dunes (CNPS 2016) from approximately 240 feet to approximately 4,800 feet above MSL. The nearest CNDDB occurrence is located approximately 5.4 miles north of the project, where approximately 100 plants were observed in 2012 in stabilized sand dune habitat (CNPS 2016). There are 226 records in the Consortium of California Herbaria database, many of which are from Riverside County in the San Jacinto Mountains area. Most of these specimens were collected from the north Palm Springs Mecca Hills and Temescal Canyon Road areas, with one collection from the Palen sand dunes (CCH 2016). The 2012 Palen sand dunes specimen collection is likely the 2012 CNDDB occurrence record.	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Although this species was documented nearby, and suitable habitat exists onsite, only the more common *Abronia villosa* var. *villosa* was seen.
Coachella Valley milkvetch	*Astragalus lentiginosus var. coachellae*	The Coachella Valley Multiple Species Habitat Conservation Plan states that this species occurs on "dunes and sandy flats, along the disturbed margins of sandy washes, and in sandy soils along roadsides and in areas formerly occupied by undisturbed sand dunes. Within the sand dunes and sand fields, this milkvetch tends to occur in the coarser sands at the margins of dunes, not in the most active blows and areas. As this species is strongly affiliated with sandy substrates, it may occur in localized pockets where sand has been deposited by wind or by active washes. It may also occur in sandy substrates in creosote bush scrub, not directly associated with sand dune habitat (BLM 2011, p. 3.18-24). This plant species blooms from February to May, producing pink to deep magenta-colored flowers. This species occurs on aeolian deposits with fewer than 25 occurrences in the Coachella Valley. Coachella Valley milkvetch depends on natural disturbances from fluvial and aeolian processes for seedling establishment (BLM 2002).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. The distribution of Coachella Valley milkvetch is restricted to the Coachella Valley in Riverside County, between Cabazon and Indio. CVAG identifies six outlying occurrences within a 5-mile area along Rice Road in the Chuckwalla Valley north of Desert Center, California (BLM 2011, p. 3.18-24); however, USFWS staff has indicated that these occurrences are not of the listed taxon (BLM, 2011).
Cove's cassia	*Senna covesii*	This species occurs on dry, sandy desert washes and slopes of the Sonoran Desert between 1,600 to 2,000 feet above MSL (CNPS 2016). The CNDDB has several records in Riverside County southwest of the project area, with the nearest occurrence recorded in 2011 approximately 5.0 miles south of the project in the Chuckwalla Mountains. California herbaria document 87 occurrences, the nearest from Corn Springs, about 5 miles southwest of the project (CCH 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Cove's cassia has a low potential to occur within the PSEGS BRSA due to the lack of suitable habitat and the project site being located below the typical elevation range where this species is known from.

Species	Latin Name	Habitat Requirements, Geographic Range, Occurrence Records	Potential to Occur on Project Site
Crucifixion thorn	*Castela emoryi*	This species occurs in Sonoran Desert and Mojavean Desert in scrub and playas with dry, gravelly washes, slopes, and plains from approximately 300 to 2,100 feet above MSL. There are 125 records in the Consortium of California Herbaria database, with the nearest occurrence 4.5 mile west of the project site (CCH 2016). The CNDDB contains 50 records for the species, many in Riverside County west of the project area and some scattered northeast and southeast of the project (CNPS 2016); the nearest CNDDB occurrence was recorded in 2011 and is located 0.8 mile north of the project's gen-tie corridor.	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Although there is appropriate habitat in the study area, and potential for a waif or two, *Castela* is a well-marked perennial plant, and would be difficult to miss during surveys.
Desert portulaca	*Portulaca halimoides*	This species occurs in Joshua tree woodlands and has been reported from Riverside, San Bernardino, and portions of Arizona and Baja, California from 3,000 feet to 3,600 feet above MSL). There are 13 CNDDB records for this species, all far to the north (CNPS 2016). There are 71 records in the Consortium of California Herbaria database (CCH 2016), the nearest being about 54 miles northwest of the site in Joshua Tree National Park.	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. It is not expected to occur within the project site due to lack of typical habitat associations and the project site being located well below the elevation range.
Desert sand parsley	*Ammoselinum giganteum*	This species occupies Sonoran creosote bush scrub and has been reported from Riverside County, California and portions of Arizona (CNPS 2016) at approximately 1,200 feet elevation. There is only one CNDDB record for the species in California (CNPS, 2016), and 2 very old historic records from the Consortium of California Herbaria database from the Hayfields area of western Chuckwalla Valley at 500 feet above MSL (CCH 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Desert sand parsley has not been collected in California since 1928, and has a low potential to occur within the PSEGS BRSA due to the lack of suitable habitat on the project site.

Species	Latin Name	Habitat Requirements, Geographic Range, Occurrence Records	Potential to Occur on Project Site
Desert spike moss	*Selaginella eremophila*	This is a dense, mat forming, non-flowering plant. This species occurs in Sonoran creosote bush scrub in gravelly or rocky soils from approximately 600 to 2,700 feet above MSL. There are 40 records in the CNDDB, with 2 from Riverside County south and southwest of the project area from 1922 and 1964; the nearest occurrence is the 1922 record located approximately 4.2 miles south of the project (CNPS 2016), There are 115 records in the Consortium of California Herbaria database from mostly Riverside and San Diego Counties with several records from Anza-Borrego Desert State Park, Palm Springs, Palm Canyon, and San Jacinto Mountain Range. One collection from Riverside County is from the vicinity of the Chocolate-Chuckwalla Mountain region near the north side of the Orocopia Mountains from sloped rocky, shady surfaces in gravelly soils (CCH 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. This species has a low potential to occur within the PSEGS BRSA due to the lack of shaded rocky habitat, and the low elevation of the project site.
Dwarf germander	*Teucrium cubense ssp. depressum*	This species occurs in desert dune, playa margins, and Sonoran desert scrub from approximately 100 feet to 1,200 feet above MSL. This species typically blooms from March to May but may also bloom from September through November. This species typically occurs in sandy soils and wash habitats and is known from fewer than 10 occurrences in California (CNPS 2016). There are 16 records from Consortium of California Herbaria database from Riverside and Imperial Counties (CCH 2016); there are records from the Chuckwalla Valley in the Hayfield area and Palo Verde Valley. There is a 1979 CNDDB record from Wiley's Well Road (400 feet elevation) (CNDDB 2016) approximately 16.5 miles southeast of the project; the nearest CNDDB occurrence is a CDFW, 2001 record from subsaline flat habitat along the Colorado River aqueduct, located approximately 15.6 miles southwest of the project (CNDDB 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. The BRSA site offers marginally appropriate habitat for this species, but dry sandy site conditions reduce the probability of occurrence.

Species	Latin Name	Habitat Requirements, Geographic Range, Occurrence Records	Potential to Occur on Project Site
Foxtail cactus	*Coryphantha alversonii*	This species occurs on rocky, granitic soils in Sonoran and Mojavean desert scrub from 200 feet to 4,600 feet above MSL. Prior to conducting spring 2009 field surveys, a reference population was observed on April 9, 2009 at a gravel pit northwest of Blythe along State Route 95 and several individuals were observed in relatively undisturbed Sonoran creosote bush scrub on granitic rock, a preferred habitat type of this species (CNPS 2016). There are 47 records of this species from the Consortium of California Herbaria database mostly from Riverside and San Bernardino Counties, including from the Chuckwalla Valley west of Desert Center (CCH 2016). The CNDDB contains 55 records for the species, most of them from Riverside County (CNDDB 2016). The nearest occurrence was documented in 1982, located 1.3 miles west of the project's gen-tie corridor along Interstate 10 (CNDDB 2016).	**LOW**. Although well-marked in its habit and vestiture, this species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Foxtail cactus has a low potential to occur within the PSEGS BRSA due to the lack of rocky desert scrub habitat.
Las Animas colubrina	*Colubrina californica*	Las Animas colubrina is an evergreen to semi-evergreen shrub that occurs in rocky Mojavean and Sonoran desert scrub (creosote bush series) and occurs at elevations from approximately 30 to 3,000 feet (CNPS 2106). It primarily occurs in dry canyons or headwater reaches of desert washes with gravelly, sandy soils. The distribution of this species includes San Diego, Imperial, and Riverside counties; portions of Arizona; Baja California; and Sonora, Mexico. This species has been reported from isolated desert locales in Joshua Tree National Monument, the Eagle Mountains, and Chuckwalla Mountains (BLM 2011). Las Animas colubrina has been identified in the Project region during surveys performed for other solar projects (BLM 2011). There are 75 records of this species in the Consortium of California Herbaria database including eleven historical records from between 1930 and 1966, four recent records found in the Colorado Desert (including several occurrences in the mountains and foothills surrounding Chuckwalla Valley (CCH 2016).	**LOW**. Colubrina was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys, and has a low potential to occur due to the absence of appropriate rocky wash margin and hillside habitat on the Project site.
Mesquite nest straw	*Stylocline sonorensis*	This species is presumed extirpated in California (CNPS 2016). It previously occupied Sonoran desert scrub around 1,300 feet elevation and has been reported from Riverside County and portions of Arizona and Sonora, Mexico. There are 2 CNDDB records from Hayfields in western Chuckwalla valley, but these are presumed extirpated (CNPS 2016). These correspond to the 2 records from the Consortium of California Herbaria database from 1930 (CCH 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Mesquite nest straw has not been seen in California since 1930, and has a low potential to occur within the PSEGS BRSA .

Species	Latin Name	Habitat Requirements, Geographic Range, Occurrence Records	Potential to Occur on Project Site
Orocopia sage	*Salvia greatae*	This species occurs in the southeastern Sonoran Desert and is associated with the Orocopia and Chocolate Mountains on alluvial slopes between 100 and 800 feet above MSL. There are 79 records from the Consortium of California Herbaria database, mostly from the Chocolate, Chuckwalla, and Orocopia mountain areas (CCH 2016). There are 25 records in the CNDDB, many from southwestern Riverside County (CNDDB 2016); the nearest documented occurrence is located approximately 21.8 miles southwest of the project.	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Although the project site has marginally appropriate habitat and elevation range, this well-marked species has a low potential of occurrence, because its distribution is restricted to areas south of the Chuckwalla mountains.
Pink fairyduster	*Calliandra eriophylla*	This species occurs in the Sonoran Desert in sandy washes, slopes and mesas from 350 to 5,000 feet above MSL. There are 116 records from the Consortium of California Herbaria database, several from the Chocolate-Chuckwalla Mountains area in Imperial and San Diego Counties (CCH 2016). There are 50 records in the CNDDB, mostly from other counties; however, the nearest documented Riverside County occurrence is a 1964 record along Interstate 10 approximately 6.3 miles east of the project (CNPS 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Marginally appropriate habitat and elevation range exists on the site for this well-marked species, but the aridity of the site and paucity of collections in the Chuckwalla valley render its potential of occurrence at low.
Pink velvet mallow	*Horsfordia alata*	This species occurs in the Sonoran Desert in California, Arizona, and Mexico. It occurs in rocky Sonoran desert scrub from approximately 300 to 1,500 feet above MSL. There are no CNDDB records for this species for the entire state of California (CNDDB, 2016). The Consortium of California Herbaria database contains 29 records from Riverside, Imperial, and San Diego Counties (CCH 2016). The nearest collection is from Palm Desert, 60 miles west of the project.	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Rocky scrub habitat does not exist on site, and there have been no historical collections in the Chuckwalla valley.
Sand evening-primrose	*Camissonia arenaria*	This species occupies sandy and gravelly areas of Sonoran desert scrub and has been reported from Imperial and Riverside Counties and areas of Arizona and Mexico from 200 feet to 2,700 feet above MSL (CNPS 2016). There are 31 records of this species in the Consortium of California Herbaria database, several from the Chocolate-Chuckwalla Mountains, Palo Verde Valley, and Ogilby Pass area (CCH 2016). There are 16 CNDDB records for this species (CNPS 2016), the closest in the Chuckwalla bench area 15 miles south from the project.	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Although marginal habitat and elevation exist on the site, this species has a low potential to occur because it is out of range, and has never been recorded in the Chuckwalla valley

Species	Latin Name	Habitat Requirements, Geographic Range, Occurrence Records	Potential to Occur on Project Site
Slender woolly-heads	*Nemacaulis denudata var. gracilis*	This species occupies desert sand dunes, coastal dunes, and Sonoran desert scrub (CNPS 2016) from 150 to 1,200 feet above MSL. There are 99 records in the Consortium of California Herbaria database, the closest approximately 30 miles northeast of the project in the Arica mountains (CCH 2016). There are 24 records in the CNDDB, with a few in western Riverside County (CNPS 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. Slender woolly-heads has never been documented in the Chuckwalla valley, and has a low potential to occur within the PSEGS BRSA, although marginally suitable habitat and appropriate elevation range exists.
Small-flowered androstephium	*Androstephium breviflorum*	This species occurs in desert dune and Mojavean desert scrub from approximately 700 feet to 2,000 feet above MSL. This species blooms from March through April and often occurs on desert bajadas. The nearest CNDDB record for this species is from Cadiz Valley approximately 24.2 miles north of the project (CNPS 2016). There are 32 records in the Consortium of California Herbaria database, the closest from the Arica mountains approximately 30 miles northeast of the project site.	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. This species has a low potential to occur within the site. Appropriate habitat exists, but *Androstephium* has never been documented this far south.
Spearleaf	*Matelea parvifolia*	This species occurs in rocky Mojavean and Sonoran desert scrub from 1,320 feet to approximately 3,300 feet above MSL. This species blooms from March through May (CNPS 2016). The nearest extant CNDDB record for this species is from the Chuckwalla Bench area during 1986 from desert dry wash woodland and creosote bush scrub habitats (CNDDB 2016). There are 28 records in the Consortium of California Herbaria database, the closest from Corn Springs, about 6 miles southwest of the project site (CCH 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys. This species has a low potential to occur within the Project Disturbance Area because the site is located below the typical elevation range of this species, and contains no rocky habitat.
Wiggins' cholla	*Cylindropuntia (=Opuntia) wigginsii*	Wiggins' cholla is not recognized as a species, but is considered a hybrid of silver cholla (*C. echinocarpa*) and pencil cholla (*C. ramosissima*). Wiggins' cholla is not found as a separate species in The Jepson Manual (1993; 2012) nor in Munz et al A California Flora and Supplement (1973); however, the BLM's Proposed Northern and Eastern Colorado Desert Coordinated Management Plan identifies Wiggins' cholla as a special-status species (BLM 2002). CNDDB and CNPS recognizes Wiggins' cholla as a CRPR 3.3 species meaning more information is needed about this species and it is not considered very endangered in California. CNPS also considers this species a sporadic hybrid of the two *Cylindropuntia* species mentioned above, and identifies occurrences in Riverside, Imperial, San Bernardino, and San Diego Counties (CNPS 2016). There are no records in the Consortium of California Herbaria database (CCH 2016).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys, and probably does not deserve recognition as a distinct taxon.

Species	Latin Name	Habitat Requirements, Geographic Range, Occurrence Records	Potential to Occur on Project Site
Winged cryptantha	*Cryptantha holoptera*	Winged cryptantha has a limited distribution in California. This is a spring-blooming annual that occurs in Mojavean and Sonoran desert scrub habitats from 300 feet to approximately 5,000 feet above mean sea level within California, Arizona, and Nevada (CNPS 2016). There are 173 records of this species in the Consortium of California Herbaria database from Riverside, Imperial, San Bernardino, and San Diego counties (CCH 2016). Winged cryptantha was observed near the Colorado Substation at the southeastern end of Chuckwalla Valley, approximately 22 miles east (Solar Millennium 2010d).	**LOW**. This species was not observed during the 2009, 2010 (spring and fall), 2013, or 2016 surveys.

APPENDIX D

Cumulative Floristic Compendium

2009 to 2017

SCIENTIFIC NAME	COMMON NAME
Abronia villosa var. *villosa*	desert sand verbena
Achyronchia cooperi	onyx flower
Acmispon strigosus	strigose lotus
Allionia incarnata	windmills
Ambrosia dumosa	white bursage
Ambrosia salsola	cheesebush
Amsinckia mensiesii var. *menziesii*	rancher's fireweed
Amsinckia tessellata	devil's lettuce
Aristida adscencionis	sixweeks three-awn
Aristida purpurea	purple three-awn
Asclepias albicans	whitestem milkweed
Asclepias erosa	desert milkweed
Asclepias subulata	skeleton milkweed
Astragalus aridus	annual desert milkvetch
Astragalus didymocarpus	dwarf white milkvetch
Astragalus insularis* var. *harwoodii	**Harwood's milkvetch**
Atrichoseris platyphylla	parachute plant
Atriplex canescens	four-wing saltbush
Atriplex canescens var. *macilenta*	salton saltbush
Atriplex polycarpa	allscale saltbush
Baileya pauciradiata	desert marigold
Baileya pleniradiata	woolly desert marigold
Bebbia juncea var. *aspera*	rush sweetbush
Boerhavia triquetra var. *intermedia*	slender spiderling
Bouteloua aristidoides	needle gramma
Bouteloua barbata var. *barbata*	six-weeks gramma
Brandegia bigelovii	desert starvine
**Brassica tournefortii*	Sahara mustard
Calycoseris wrightii	white tackstem
Caulanthus lasiophyllus	California mustard
Chaenactis carphoclinia	pebble pincushion
Chaenactis fremontii	Fremont's pincushion
Chaenactis stevioides	desert pincushion
Chorizanthe brevicornu	brittle spineflower
Chorizanthe corrugata	wrinkled spineflower
Chorizanthe rigida	spiny herb
Chylismia brevipes ssp. *brevipes*	golden suncup
Chylismia claviformis	browneyes
Cisthanthe ambigua	desert calandrinia
Condalia globosa* var. *pubescens	**spiny abajo**

SCIENTIFIC NAME	COMMON NAME
Croton californicus	California croton
Cryptantha angustifolia	narrow leaved cryptantha
Cryptantha barbigera	bearded cryptantha
Cryptantha costata	**ribbed cryptantha**
Cryptantha maritima	Guadalupe cryptantha
Cryptantha micrantha	redroot cryptantha
Cryptantha nevadensis	Nevada cryptantha
Cryptantha pterocarya var. *cycloptera*	wingnut cryptantha
Cryptantha pterocarya var. *pterocarya*	wingnut cryptantha
Cucurbita palmata	coyote melon
Cuscuta sp.	dodder
Cylindropuntia bigelovii	teddybear cholla
Cylindropuntia echinocarpa	silver cholla
Cylindropuntia ramosissima	pencil cholla
Dalea mollis	hairy prairie clover
Dalea mollissima	silky dalea
Datura discolor	jimson weed
Dicoria canescens	dicoria
Ditaxis lanceolata	narrowleaf ditaxis
Ditaxis neomexicana	New Mexico ditaxis
Ditaxis serrata* var. *californica	**California ditaxis**
Dithyrea californica	spectacle pod
Echinocactus polycephalus var. polycephalus	cottontop cactus
Echinocereus engelmannii	hedgehog cactus
Emmenanthe pendulifera	whispering bells
Encelia farinosa	brittlebush
Encelia fructescens	button brittlebush
Eremalche exilis	white mallow
Eremalche rotundifolia	desert fivespot
Eremothera boothii ssp. desertorum	desert suncup
Eriastrum harwoodii	**Harwood's woolystar**
Eriastrum sparsiflorum	Great Basin woolystar
**Erodium cicutarium*	red stem filaree
Erodium texanum	desert heron's bill
Eriogonum inflatum	desert trumpet
Eriogonum thomasii	Thomas' buckwheat
Eschscholzia glyptosperma	desert golden poppy
Eschscholzia minutiflora	pygmy poppy
Eschscholzia parishii	Parish's poppy
Eucrypta micrantha	desert hideseed

SCIENTIFIC NAME	COMMON NAME
Euphorbia micromeria	Sonoran sandmat
Euphorbia polycarpa	smallseed sandmat
Euphorbia setiloba	Yuma sandmat
Fagonia laevis	California fagonia
Ferocactus cylindraceus var. *cylindraceus*	barrel cactus
Festuca octoflora	sixweeks fescue
**Festuca sp.*	fescue
Fouquieria splendens	ocotillo
Funastrum hirtellum	hairy milkweed
Funastrum utahense	**Utah vine milkweed**
Geraea canescens	desert sunflower
Gilia scopulorum	rock gilia
Gilia stellata	star gilia
Heliotropium convolvulaceum var. *californicum*	bindweed heliotrope
Hesperocallis undulata	desert lily
Hibiscus denudatus	paleface
Hilaria rigida	big galleta grass
Hyptis emoryi	desert lavendar
Isocoma acradenia	alkali goldenbush
Justicia californica	chuparosa
Kallstroemia californica	California caltrop
Krameria bicolor	white rhatany
Langloisia setosissima ssp. *setosissima*	bristly langloisia
Larrea tridentata	creosote bush
Lepidium lasiocarpum	pepperweed
Linanthus jonesii	Jones' lananthus
Loeseliastrum matthewsii	Desert calico
Loeseliastrum schottii	Schott's calico
Lupinus arizonicus	Arizona lupine
Lupinus concinnus	bajada lupine
Lycium andersonii	Anderson's desert thorn
Malacothrix glabrata	desert dandelion
Mammillaria tetrancistra	fishook cactus
Marina parryi	Parry's false prairie clover
Mentzelia affinis	yellowcomet
Mentzelia albicaulis	white stemmed stickleaf
Mentzelia involucrata	whitebract blazingstar
Mentzelia multiflora var. *longiloba*	yerba amarilla
Mirabilis laevis var. *retrorsa*	wishbone bush
Monolepis nuttalliana	poverty weed

SCIENTIFIC NAME	COMMON NAME
Monoptilon bellioides	Mojave desertstar
Nama demissum var. *demissum*	purplemat
Nama pusillum	small leaved nama
Nemacladus glanduliferus	glandular threadplant
Nicotiana obtusifolia	desert tobacco
Oenothera deltoides ssp. *deltoides*	birdcage desert primrose
Oenothera primiveris ssp. *bufonius*	desert evening primrose
Oligomeris linifolia	lineleaf whitepuff
Olneya tesota	desert ironwood
Opuntia basilaris	prickly pear cactus
Orobanche cooperi	desert broomrape
Palafoxia arida var. arida	spanish needles
Parkinsonia florida	blue palo verde
Pectis papposa var. papposa	chinch weed
Pectocarya heterocarpa	combseed
Pectocarya platycarpa	broadfruit combseed
Perityle emoryi	Emory's rockdaisy
Petalonyx thurberi	sandpaper plant
Petunia parviflora	wild petunia
Phacelia crenulata var. *ambigua*	purplestem phacelia
Phacelia crenulata var. *minutiflora*	cleftleaf phacelia
Phacelia distans	common phacelia
Phacelia neglecta	alkali phacelia
**Phalaris minor*	little-seed canary grass
Phoradendron californicum	desert mistletoe
Physalis crassifolia	ground cherry
Plantago ovata	wooly plantain
Prosopis glandulosa	honey mesquite
Psathyrotes ramosissima	turtleback
Psorothamnus emoryi	indigo bush
Psorothamnus schottii	Schott's indigo bush
Psorothamnus spinosus	smoke tree
Rafinesquia neomexicana	desert chicory
**Salsola tragus*	russian thistle
Salvia columbariae	chia
**Schismus arabicus*	Mediterranean grass
Senegalia greggii	catclaw acacia
Sesuvium verrucosum	western sea-purslane
**Sisymbrium irio*	London rocket
Sphaeralcea ambigua	desert globemallow

SCIENTIFIC NAME	COMMON NAME
Stephanomeria pauciflora var. *pauciflora*	wire lettuce
Stillingia spinulosa	broad leaved stillingia
Stipa hymenoides	indian rice grass
Streptanthella longirostris	longbeak fiddle mustard
Stylocline gnaphaloides	nest straw
Suaeda nigra	bush seepweed
**Tamarix sp.*	tamarisk
Tidestromia suffruticosa var. *oblongifolia*	Arizona honeysweet
Tiquilia plicata	fanleaf crinklemat
Trianthema portulacastrum	horse purslane
Trichoptilium incisum	yellowhead
Ziziphus obtusifolia var. *canescens*	graythorn

* Nonnative species

Bold face indicates special status species

APPENDIX E

Memorandum: Potential Impacts to Federal ESA-Listed Bird Species

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April 17, 2017

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SUBJECT: Potential Impacts to Federal ESA-Listed Bird Species - Palen Solar Photovoltaic Project

Mr. De La Garza:

This memorandum provides an assessment of impacts to bird species listed as threatened or endangered under the Federal Endangered Species Act (ESA) that may result from the Palen Solar PV Project (Project). While no suitable breeding or wintering habitat for ESA-listed bird species occurs within or near the Project, incidental records of ESA-listed bird species at other utility-scale solar projects in California suggest that analyzing the potential effects to such species may be warranted. This memorandum addresses the following four ESA-listed species:

- Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) – Threatened;
- Southwestern willow flycatcher (*Empidonax traillii extimus*) – Endangered;
- Least Bell's vireo (*Vireo bellii pusillus*) – Endangered; and
- Ridgeway's [Yuma Ridgway's] rail (*Rallus obsoletus yumanensis* [*R. longirostris y*]) – Endangered.

Baseline avian data and analysis of potential effects to these listed species have been partly described in the *Bird and Bat Conservation Strategy for the Palen Photovoltaic Solar Project* (BBCS, Western EcoSystems Technology [WEST] 2017a), *Biological Resources Technical Report for the Palen Solar PV Project* (Ironwood Consulting 2017), and *Biological Opinion on the Proposed Land Use Plan Amendment* (LUPA) *under the Desert Renewable Energy Plan* (DRECP) (U.S. Fish and Wildlife Service [USFWS] 2016). The Project's BLM right-of-way application predates the DRECP and is therefore not subject to the provisions of the LUPA Biological Opinion; however, the effects analysis regarding ESA-listed bird species in the LUPA Biological Opinion is relevant because the Project is located within a development focus area (DFA) per the LUPA. This memorandum summarizes key elements of these documents to support the preparation of the Project's Supplemental Environmental Impact Statement / Report (SEIS/EIR).

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Status of ESA-Listed Species

Western yellow-billed cuckoos, southwestern willow flycatchers, and least Bell's vireos are alike in that they breed in riparian habitats in California, winter south of the United States-Mexico border, and migrate though the Colorado Desert between breeding and wintering habitats. It should be noted that the riparian habitat associated with these listed species is different than the xeric, microphyll riparian scrub woodland found on and near the Project site. Yuma Ridgway's rail nests in freshwater marshes and is distinct from the other listed bird species in that they are not known to regularly migrate between areas of breeding habitat. The descriptions below include information on the species' listing status, habitat preferences, distribution, population status, migration potential, and records associated with existing solar facilities is described separately below.

Western Yellow-Billed Cuckoo

The western yellow-billed cuckoo was listed as threatened on 3 November 2014 (79 Federal Register [FR] 59991) because the number of western yellow-billed cuckoos in the western United States had declined substantially over the past 100 years. This species is known to currently breed in portions of California, Nevada, Arizona, and New Mexico that support extensive riparian areas. The USFWS estimated the current breeding population at 680 to 1,025 pairs, with 350 to 495 pairs north of the Mexican border and the remainder in Mexico (USFWS 2016). The winter range of the western yellow-billed cuckoo is relatively unknown (USFWS 2016).

The closest known breeding habitat to the Project site is located approximately 35 miles away along the Colorado River (USFWS 2016). There have been no documented sightings of western yellow-billed cuckoos within the LUPA DFAs (USFWS 2016). Western yellow-billed cuckoos migrate across the desert and use scrub habitat during migration (USFWS 2016). Dead western yellow-billed cuckoos have been found in or adjacent to desert scrub habitat in the Ivanpah Valley and eastern Riverside County (Davis 2015; Beeler 2015 - as cited in USFWS 2016).

Two records of dead western yellow-billed cuckoos have been noted to date at concentrating solar power (CSP) facilities in California (USFWS 2016). These records occurred at Ivanpah Solar Electric Generating System, during construction in 2012, and Genesis Solar Project (Davis 2015; Beeler 2015; WEST 2016a - as cited in USFWS 2016). The causes of death were unknown. There is limited information regarding mortalities of western yellow-billed cuckoos at renewable energy facilities outside California (USFWS 2016). No mortalities of western yellow-billed cuckoos have been reported from renewable energy facilities in Nevada (Nicolai 2015 as cited in USFWS 2016). No mortalities of western yellow-billed cuckoos have been reported from solar photovoltaic (PV) facilities (Althouse and Meade 2014 [Topaz]; H. T. Harvey and Associates 2014 [CVSR]; and WEST 2016b).

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Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed endangered on 27 February 1995 (60 FR 10694) because of threats related to large-scale loss of habitat and nest parasitism by the brown-headed cowbird (*Molothrus ator*). This species breeds in dense riparian habitats in the southwestern United States, and winters in southern Mexico, Central America, and northern South America (USFWS 2002). Over the past decade, survey data from various breeding sites in California suggest that the number of territories has declined (USFWS 2016).

The closest known breeding habitat to the Project site is approximately 35 miles away along the Colorado River and adjacent to the Salton Sea (USFWS 2016). Southwestern willow flycatchers migrate through the Colorado Desert (USFWS 2016). Migrating willow flycatchers may use a wider range of habitats during migration than during breeding (Craig and Williams 1998 - as cited in USFWS 2016).

Willow flycatchers have been found dead at solar facilities and overhead powerlines in the California desert; however, none of the dead birds were identified as the ESA-listed southwestern willow flycatcher (Guigliano 2015; Dietsch 2015a; Dietsch 2015b; EDM International 2016 - as cited in USFWS 2016). There is limited information regarding mortalities of southwestern willow flycatchers at renewable energy facilities outside California (USFWS 2016). No mortalities of southwestern willow flycatchers have been reported from renewable energy facilities in Nevada (Nicolai 2015 as cited in USFWS 2016).

Least Bell's Vireo

The least Bell's vireo was listed as endangered on 2 May 1986 (51 FR 16474) because of similar threats to that of the southwestern willow flycatcher as mentioned above. This species breeds in structurally diverse riparian habitats in Southern California and portions of northern Baja California, Mexico and winters in southern Baja California, Mexico (USFWS 1998). The distribution of this species has likely increased since its listing, although it remains absent from large parts of its former range (USFWS 2016). The closest known breeding habitat to the Project site is over 70 miles to the northwest in the Big Morongo Canyon (USFWS 2016). Least Bell's vireos are also uncommon breeders at the Anza Borrego Desert State Park, located approximately 70 miles southwest of the Project site (USFWS 2016). The subspecies Arizona Bell's vireo (*V. b. arizonae*) is not ESA-listed, but is State-listed as endangered, and is known to occur along the lower Colorado River, approximately 35 miles east of the Project site.

Least Bell's vireos likely migrate through the Colorado Desert; however, there is little information on this species' migration behavior (USFWS 2016). It is presumed that this species may utilize patches of riparian habitat varying in size and possibly upland scrub habitat during migration (USFWS 2016).

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There have been no reports of least Bell's vireos found dead or injured at renewable energy facilities (USFWS 2016).

Yuma Ridgway's Rail

The Yuma Ridgway's rail was listed as endangered on 11 March 1967 (32 FR 4001). Until recently, Ridgway's rail (*Rallus obsoletus yumanensis*) was considered three different sub-species (BirdLife International 2014; Chesser et al. 2014), including Yuma clapper rail (*Rallus obsoletus yumanensis*, formerly *R. longirostris yumanensis*), light-footed clapper rail (*R.o. levipes*), and California rail (*R.o. obsoletus*). The revision of the name of the species did not affect the taxon with regard to its listing as endangered. Because of this separation, population data were divided between the different subspecies. For the purposes of this analysis and based on the USFWS's identification of the Yuma clapper rail as the likely sub-species present in the Project vicinity (USFWS 2009), population trends, life histories, and migration and dispersal behaviors for only Yuma clapper rail as identified in the literature, in agency profiles and abstracts and other specified sources are a discussed herein.

The current known range of Yuma Ridgway's rail includes portions of Arizona, California, Nevada, and Colorado River delta regions in Mexico (Arizona Game and Fish Department [AZGFD] 2001; USFWS 2009; BirdLife International 2014). This species is found along the lower Colorado River southward to its terminus at the Sea of Cortez, along the Gila River drainage in Arizona, at Lake Mead (and the Overton Arm) and its local tributaries, along the Virgin River in Nevada and Utah, and at the Salton Sea/Imperial Valley areas of California (California Energy Commission [CEC] et. al 2014; USFWS 2014). In these areas, the species nests and feeds primarily on invertebrates in freshwater marsh habitats from which most individuals do not migrate (USFWS 2014). Many of the areas that support important habitat for Yuma Ridgway's rail are Federal or State-owned lands with existing management plans including the Cibola and Sonny Bono Salton Sea National Wildlife Refuges located approximately 35 miles from the Project site (USFWS 2016).

Estimates of population size have been difficult to ascertain for Yuma Ridgway's rail. Studies performed in the U.S. from 2006 to 2014 indicate that the number individuals declined steadily (USFWS 2016). Recent population estimates include 7,714 to 9,686 individuals along the Colorado River Delta in Mexico in 2010 and 2011 (Hinojosa-Huerta et al. 2013 - as cited in USFWS 2016). Yuma Ridgway's rails in Mexico have the potential to disperse into the United States (USFWS 2016).

The extent of dispersal or migration between the populations is not well known (USFWS 2009); however, outlier records across the desert suggest some level of movement may occur (USFWS 2016). Outlier observations of Yuma Ridgway's rails have been documented at Harper Dry Lake, East Cronese Dry Lake, and Desert Center at a great distance from known breeding areas (USFWS 2016). The triggers for movements appear to be the need to find suitable habitat, the need to find mates, and/or the need to locate food (Eddleman 1989 as cited in CEC et. al 2014). Eddleman (1989 as cited

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in USFWS 2009) suggested that availability of suitable habitat and food sources, specifically crayfish on the Lower Colorado River may influence the rail's need to migrate. Similar conditions and circumstances may be applicable to the population on the Salton Sea, where a large portion of a recent decline in the population from 2007 to 2014 appears to have been due largely to lack of sufficient water and routine maintenance to support suitable breeding conditions at the Imperial Wildlife Area (USFWS 2009; Riesz 2015). It is currently presumed that a majority of the Yuma Ridgway's rail on the Lower Colorado River and Salton Sea do not migrate but rather remain in the general area year-round (AZGFD 2001, USFWS 2009, CEC et. al 2014).

Two records of dead Yuma Ridgway's rails have been noted to date at solar facilities in California, one at the fixed PV Desert Sunlight Solar Project in Riverside County during construction in 2013 and one at the single axis tracker PV Solar Gen 2 Project in Imperial County in 2014 (USFWS 2016). The causes of death were unknown. A live Yuma Ridgway's rail, observed to be uninjured, was recorded at the Blythe Solar PV Project during construction in 2015 (USFWS 2016). There is limited information regarding mortalities of Yuma Ridgway's rails at renewable energy facilities outside California (USFWS 2016). No mortalities of Yuma Ridgway's rails have been reported from known renewable energy facilities in Arizona or Nevada (Fitzpatrick 2015b; Nicolai 2015 - as cited in USFWS 2016). No Ridgeway rails have been found during the two subsequent years of standardized monitoring at Desert Sunlight, or the first years of monitoring at the Blythe and McCoy projects.

Potential Effects to Listed Species

Loss of Habitat

Development of the Project would result in the removal of approximately 3,500 acres of desert habitat, which does not represent typical stopover habitat for ESA-listed bird species, but may be used during dispersal or migration. On a larger scale assessing all DFWs (over 38,000 acres) within the entire LUPA, the USFWS concluded that the loss of habitat would not likely adversely affect migration of these riparian-nesting species (USFWS 2016). This conclusion was reached based on several factors, including:

- The loss of habitat within all DFAs would comprise less than 1% of the total land within the LUPA;
- BLM-managed lands are intermixed with millions of acres of lands owned by other agencies and private parties, which provide habitat to for migrating birds;
- The BLM would avoid the majority of riparian areas within the LUPA and these areas will likely provide the highest quality resting and foraging habitat riparian-nesting species; and

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- The location and distribution of solar facilities within the DFAs would not impose a substantial barrier to individuals of the listed riparian-nesting species during migration or preclude their movement across the desert.

Collision and Electrocution

The potential for individuals of the four ESA-listed species to collide with Project infrastructure is expected to be similar to that of other resident and migratory bird species if they are in the vicinity of the Project. Above-ground infrastructure that may add to collision risk includes solar panels, meteorological towers, power lines, fences, buildings, and large equipment. The Project would consist of PV technology and would not involve collision risks associated with turbines, heliostats, or power towers. Electrocution may occur if birds encounter aboveground, electrified powerlines including the gen-tie line; however, with regard to these ESA-listed species, electrocution potential is relatively low due to their narrow wing span.

Lighting

Southwestern willow flycatcher, least Bell's Vireo, and yellow-billed cuckoo are known to migrate at night. Yuma Ridgway's rail dispersal behavior is less understood, but this species is also thought to migrate at night. Artificial lighting may serve as an attractant when deployed on artificial structures (e.g., communication towers, offshore oil platforms), which can result in night-migrating birds colliding with these structures (Poot et al. 2008, Gehring et al. 2009, Kerlinger et al. 2010 – as cited in WEST 2017a). During construction, artificial lighting typically includes lights from construction vehicles when and if construction occurs during the overnight hours, lights on structures (e.g., office trailers), parking areas, site security facilities, and possible lighting associated with project roads. During operations, artificial lighting typically includes lights on buildings and site security facilities.

Indirect Effects

The presence of construction activities, personnel, equipment, and solar infrastructure may result in indirect effects to wildlife in general, including ESA-listed birds. Potential indirect effects that may that may occur over time include increase risk of fire, degradation of habitat due to spread of invasive weed species, and attraction of potential predators (e.g., common raven [*Corvus corax*]). Additionally, the hypothesis that bird species might interpret solar facilities as water has been proposed by Kagan et al. (2014), Walston et al. (2015), and Huso et al. (2016). Currently, the data are inconclusive with respect to supporting or refuting the lake effect hypothesis (WEST 2017b). Data from three publicly available studies at PV solar facilities suggest that avian fatalities were generally distributed across numerous species, typically passerines, doves, and pigeons (WEST 2017b). No water-associated bird fatalities were discovered at two of the three sites, California Valley Solar Ranch (CVSR) and Topaz (H. T. Harvey and Associates 2014; Althouse and Meade 2014). Water-associated bird fatalities were

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discovered at the fixed PV Desert Sunlight Solar Project; however, overall estimates of water-associated bird mortality did not differ significantly from estimates of non-water associated bird mortality among arrays (WEST 2016b). Further studies are needed, and have been recently proposed, to explore of the lake effect hypothesis in terms of the causal mechanisms and how birds perceive solar energy facilities (WEST 2017b). Additional discussion on the lake effect hypothesis is included in the technical memorandum prepared for the Project (WEST 2017b).

Effects Not Applicable to the Project

Other effects generally associated with solar facilities include evaporation ponds, entanglement with netting, and solar flux. Due to the proposed PV technology, the Project would not involve the use of evaporation ponds and thus entanglement with pond netting would not occur. The Project would also not create solar flux.

Minimization Measures

Measures for avoiding, minimizing, and mitigating potential adverse effects to resident and migratory bird species are included in the Project's adopted PSPP Mitigation Measures (MMs), Applicant Proposed Measures (APMs), and BBCS. A summary is provided below.

Project design would include several measures to avoid or minimize risk to birds during construction and operations. Utility lines would be designed to prevent bird injury and fatalities resulting from to electrocution. Utility lines would be built following Avian Power Line Interaction Committee (APLIC) Guidelines (APLIC 2012) to minimize electrocution risks. To further minimize effects to birds, structures would consist of monopole or dual-pole design versus lattice tower design to minimize perching and nesting opportunities, as well as reduce the likelihood of bird collisions. The Project would minimize and control the use of external lighting per PSPP MM BIO-8 and VIS-3, which would reduce the potential for lighting to have a measurable effect on ESA-listed species.

The Project would implement additional measures to avoid or minimize potential effects to wildlife in general, including birds. PSPP MM BIO-8 would require implementation of APLIC guidelines to reduce the risk of electrocution of large birds, as well as the preparation of a Nesting Bird Management and Monitoring Plan. To minimize the likelihood of vehicle strikes to wildlife during construction vehicle speeds would be limited to under 25 miles per hour on all dirt Project access roads. Any instances of road-killed animals or other carcasses detected by personnel on roads associated with the Project would be reported and removed promptly. All trash and food-related waste would be contained in secure, closed lid containers to reduce the attractiveness of the site to opportunistic predators, such as common ravens and coyotes, and to prevent trash from being exposed or blown around the Project. Equipment and vehicle travel would be limited to existing roads or specific construction pathways during construction. A site-specific Worker Environmental

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Awareness Program (WEAP) per PSPP MM BIO-6 would be developed that would include information regarding sensitive biological resources, including listed bird species, and emphasize reporting all dead or alive bird observations to the Designated Biologist or Biological Monitor. The Project would use the minimal amount of water needed for dust abatement to prevent the formation of puddles, which could attract birds and other wildlife. To minimize the potential effects of habitat loss due to fire, fire prevention measures would be implemented per PSPP MM BIO-6 and PSPP MM WS-1 and 2. Indirect effects to adjacent lands from the potential spread of weeds would be controlled through the implementation of the Weed Management Plan per PSPP MM BIO-14. All unused material and equipment will be removed upon completion of construction and maintenance activities outside the permanently fenced site. The risk of attracting common ravens to the Project, which could result in increased predation on native species including migrating or dispersing listed birds, will be controlled through implementation of the Common Raven Monitoring, Management, and Control Plan per PSPP MM BIO-13.

A comprehensive list of minimization measures that directly or indirectly relate to the protection of birds are listed in APM-52 as Tier 1 Impact Avoidance Measures, as follows:

1) *The Project owner shall initiate consultation with USFWS and CDFW if there is a Project-attributed injury or mortality to any species regulated by BGEPA, ESA or CESA.*
2) *PSPP MM BIO-1: Designated Biologist Selection and Qualifications*
3) *PSPP MM BIO-2: Designated Biologist Duties*
4) *PSPP MM BIO-3: Biological Monitor Selection and Qualifications*
5) *PSPP MM BIO-4: Biological Monitor Duties*
6) *PSPP MM BIO-6: Worker Environmental Awareness Program (WEAP)*
7) *PSPP MM BIO-8: Impact Avoidance and Minimization Measures (e.g., 1. Limit disturbance areas; 2. Minimize road impacts; 3. Minimize traffic impacts; 4. Monitor during construction; 5. Minimize impacts of transmission/pipeline alignments, roads, and staging areas; 6. Avoid use of toxic substances; 7. Minimize lighting impacts; 8. Minimize noise impacts; 12. Minimize standing water; 13. Dispose of road-killed animals; 14. Minimize spills of hazardous materials; 15. Worker guidelines; 17. Monitor ground disturbing activities prior to pre-construction site mobilization; 18. Control unauthorized use of the project access roads; 20. Avoid spreading weeds)*
8) *PSPP MM BIO-12: Desert Tortoise Compensatory Mitigation*
9) *PSPP MM BIO-13: Raven Management Plan and Fee*
10) *PSPP MM BIO-14: Weed Management Plan*
11) *PSPP MM BIO-15: Pre-Construction Nest Surveys and Avoidance Measures*
12) *PSPP MM BIO-16: Avian Protection Plan*
13) *PSPP MM BIO-18: Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures*

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14) *PSPP MM BIO-19: Special-Status Plant Impact Avoidance, Minimization and Compensation*
15) *PSPP MM BIO-21: Mitigation for Impacts to State Waters (e.g., 1. Acquire off-site state waters)*
16) *PSPP MM BIO-25: Golden Eagle Inventory and Monitoring*
17) *PSPP MM BIO-26: Evaporation Pond Netting and Monitoring*
18) *PSPP MM VIS-03: Temporary and Permanent Exterior Lighting (e.g., minimize visibility, minimize glare, minimize illumination)*
19) *PSPP MM VIS-04: Project Design (e.g., minimize the number of structures, reduce the amount of disturbed area)*
20) *APM-1: Designated Biologist*
21) *APM-2: Worker Education Program*
22) *APM-4: Integrated Weed Management Actions*
23) *APM-6: Noise Controls for Special-Status Species*
24) *APM-7: Standard Practices to Protect Special Status Species (e.g., prohibition of domestic pets)*
25) *APM-16: Bendire's Thrasher Monitoring*
26) *APM-17: Passive Burrow Exclusion*
27) *APM-18: Golden Eagle Nest Avoidance*
28) *APM-19: Golden Eagle Compensation*
29) *APM-20: Contribution to Golden Eagle Monitoring Program*
30) *APM-42: Manage Visual Resources as VRM Class IV*
31) *APM-45: Visual Design Standards*
32) *APM-46: Required Visual Resource BMPs*

Avian Monitoring and Reporting

Specifications for avian fatality monitoring and reporting during construction and post-construction (operations) are also included in the Project's adopted PSPP MMs, APMs, and BBCS. Relevant measures are summarized below.

Site personnel would be required to report any injured or dead birds found within the Project limits and the applicant would report such sightings to the BLM. PSPP MM BIO-2 requires the Designated Biologist to notify the BLM, USFWS, and CDFW of any dead or injured listed species found on the Project. PSPP MM BIO-5 provides authorization to the Designated Biologist to immediately stop any Project activity to avoid take of an individual of a listed species.

The BBCS (Section 5.0) includes a post-construction monitoring program that provides a standardized approach to document known bird and bat fatalities and injuries, and to estimate seasonal and annual post-construction fatality rates associated with Project features. The monitoring program is

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founded on a statistically sound spatial and temporal sampling design, including protocols for independently estimating and correcting for quarterly searcher-efficiency and seasonal (i.e., at least quarterly) scavenger (avian and mammalian) removal rates. It describes specific data to be collected during scheduled carcass searches, protocols for handling any dead or injured birds and bats that are found, and procedures for reporting incidents to applicable government agencies. The monitoring program includes sampling of solar arrays and regular inspections of the perimeter fence and gen-tie line. The BBCS includes instructions and contact information for rehabilitation facilities that work with injured birds. The BBCS (Section 6.0) includes reporting requirements and conditions the applicant to report all documented bird and bat injuries and fatalities to the BLM, CDFW and USFWS using the USFWS Avian Injury and Mortality Reporting Form.

Adaptive Management

Adaptive management actions, which may be implemented during and/or following the post-construction monitoring program, are described in the BBCS (Section 7.0) and APM-52. Adaptive management would follow a data-driven approach whereby problems would be assessed in the context of other sources of anthropogenic impact (e.g., other solar facilities) to bird species. The guiding principles associated with adaptive management are:

- Recommendations will be made based on best available science and existing approvals and permits to address specific issues resulting from the Project;
- Recommendations will be assessed by all agencies involved, as well as representatives for the Project;
- Provide sufficient flexibility to adapt as more is learned about the Project as well as strategies to reduce avian impacts, if warranted;
- Review results of fatality monitoring;
- Review annual report on status of compliance with mitigation measures and permit conditions and provide recommendations to the BLM and the Riverside County equivalent, as necessary.
- Evaluate effectiveness of implemented adaptive management strategies and provide the BLM and the Riverside County equivalent with recommendations based on findings.

After at least two monitoring seasons have passed, data will be reviewed to determine if adjustments to the monitoring frequency are warranted based on carcass persistence trial results. The applicant and the agencies will also meet at the end of the second year of monitoring to determine if continued/focused monitoring is warranted. Continued, focused monitoring may be warranted if data indicate that bird mortality caused by solar facilities is substantial and is having potential adverse impacts on special-status bird populations or there are other special circumstances. Such monitoring will be designed to address specific concerns that are identified after review of the data.

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Furthermore, the BBCS directly references the stepwise adaptive management program described in APM-52 to reduce or offset fatalities caused by the Project. APM-52 provides the framework for adaptive management, including a definition of mitigation performance standards and two additional tiers of impact reduction measures, described as follows:

The Project owner shall implement a bird and bat adaptive management program that includes potential measures the Project owner can implement to adaptively respond to detected mortality and injuries attributable to the Project. Adaptive actions undertaken will be discussed and evaluated in survey reports prepared under the Project's BBCS. Any impact reduction measures must be commensurate (in terms of factors that include geographic scope, costs, and scale of effort) with the level of avian or bat mortality or injury that is specifically and clearly attributable to the Project facilities, consistent with the nexus and proportionality requirements of California statutory and constitutional law and of U.S. constitutional law.

a. *Performance Standards. Appropriate performance standards for mitigation of impacts to any species regulated by BGEPA [Bald and Golden Eagle Protection Act], ESA [Federal Endangered Species Act], and CESA [California Endangered Species Act] exist through required consultation with USFWS and CDFW under their respective regulatory and permitting frameworks, as specified in Tier 1 Measures, below. For impacts to all other special status avian and bat species, adaptive management measures must reduce or offset mortalities caused by the Project to a level that avoids a substantial, long-term reduction in the demographic viability of the population of the species in question, as estimated through implementation of the Project BBCS, which employs the structured approach set forth in the USFWS Land-Based Wind Energy Guidelines (USFWS 2012).*

b. *Impact Reduction Measures.*
   i. *Tier 1 Measures. [noted in "Minimization Measures" above]*
   ii. *Tier 2 Measures. If Tier 1 measures do not achieve the performance standards described above, the monitoring results of the Project, as well as those of other PV projects and the results of their respective impact reduction efforts, will be analyzed to formulate additional impact reduction measures to achieve the performance standards. Such measures may include, but not be limited to:*
      1) *Use of a secure cover or floating, high-density plastic balls to cover construction ponds, as recommended by the Federal Avian Administration's "Wildlife Hazard Management at Airports" manual.*
      2) *Passive avian diverter installations along the perimeter or at other locations within the Project to reduce or minimize bird use of the site.*
      3) *The use of sound, light or other means to discourage site use consistent with applicable legal requirements.*
      4) *Onsite habitat management or prey control measures consistent with applicable legal requirements.*

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5) *Modifications to support structures or other facilities to exclude nesting birds (e.g., netting or shielding around framework; capping open pipes or tubing).*

iii. *Tier 3 Measures. In the event Tier 1 and Tier 2 avoidance and minimization measures do not meet the above performance standards, or upon election of the Project owner, the Project owner shall implement compensatory mitigation on terms and at ratios deemed appropriate by USFWS and/or CDFW to meet the performance standard applicable to the species in question. Such measures shall be approved by USFWS and/or CDFW and may include, but not be limited to:*

1) *Restoration of degraded off-site habitat with native vegetation.*
2) *Restoration of off-site agricultural fields to bird habitat.*
3) *Management of off-site agricultural fields to enhance bird populations.*
4) *Retrofitting of structures to minimize collisions.*
5) *Support for avian and bat research and/or management efforts conducted by entities approved by the USFWS and CDFW within the Project's mitigation lands or other approved locations.*
6) *Funding efforts to address avian diseases or depredation due to the expansion of predators in response to anthropomorphic subsidies that may adversely affect birds that use the mitigation lands or other approved locations.*
7) *Contributions to the Migratory Bird Conservation Fund managed by the Migratory Bird Conservation Commission.*

Summary and Conclusion

The western yellow-billed cuckoo, southwestern willow flycatcher, and least Bell's vireo are riparian-nesting species that breed and winter mostly outside of the Colorado Desert. No suitable breeding or wintering habitat for these ESA-listed bird species occurs on or adjacent to the Project site. The nearest suitable habitat for the western yellow-billed cuckoo and southwestern willow flycatcher is located approximately 35 miles west of the Project site along the Colorado River. The nearest suitable habitat for the least Bell's vireo is located approximately 70 miles northwest of the Project site in Big Morongo Canyon. Individuals of these species migrate through the Colorado Desert between breeding or wintering habitat. During migration, these species may fly over the Project vicinity. There remains a potential for these species to occasionally stopover within the Project vicinity.

The Yuma Ridgway's rail nests in freshwater marshes and generally disperse or migrate to a lesser degree than the riparian-nesting ESA-listed species. The nearest suitable habitat for the Yuma Ridgway's rail is located approximately 35 miles from the Project site along the Colorado River and Salton Sea. Records of Yuma Ridgway's rail have been documented at outlying locations from known breeding habitat. This species may fly over or temporarily stopover within the Project vicinity.

Overall, the potential for these ESA-listed bird species to occur within the Project vicinity is low. The existence of outlying records and documented dispersal or migration suggest that there is a remote possibility that transient individuals may occasionally occur in the Project vicinity during the 30-year lease period. If they were to occur, the potential effects may include loss of habitat, collision, electrocution, artificial lighting, increased fire risk, degradation of habitat due to invasive weed species, and increased predation threat. These potential effects would be avoided, minimized, or mitigated for through the Project's adopted PSPP MMs, APMs, and BBCS. The Project would involve PV technology and consequently would not include the use of evaporation ponds or netting and would not create solar flux; therefore, the effects associated with these features would not occur.

In conclusion, the Project is not expected to adversely affect populations of ESA-listed bird species with regard to breeding habitat, reproductive capacity, ability to disperse, or migration because occurrences of these species on the Project site are expected to be infrequent, at most, during the 30-year lease period and potential effects to these species would be reduced substantially through the implementation of a comprehensive set of avoidance, minimization, and mitigation measures.

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www.ironwoodbio.com

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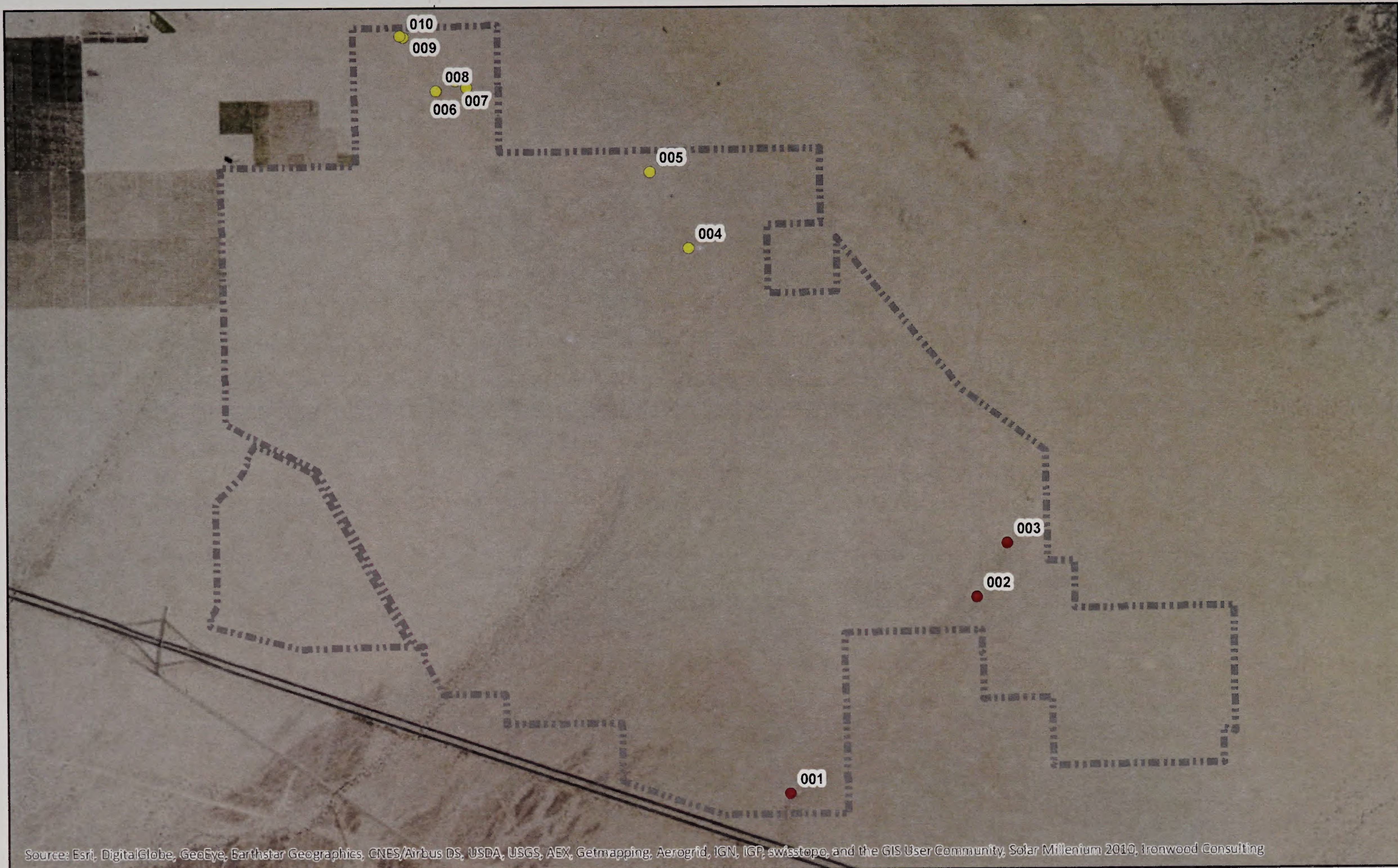
Appendix B-2

Creosote Ring Assessment



Ironwood Consulting

0 500 1,000
Meters

Study Area
Gen-Tie Line
SCE Red Bluff Substation

Potential Creosote Ring
Confirmed Negative
Possible

Palen Solar PV Project

Creosote Ring Assessment

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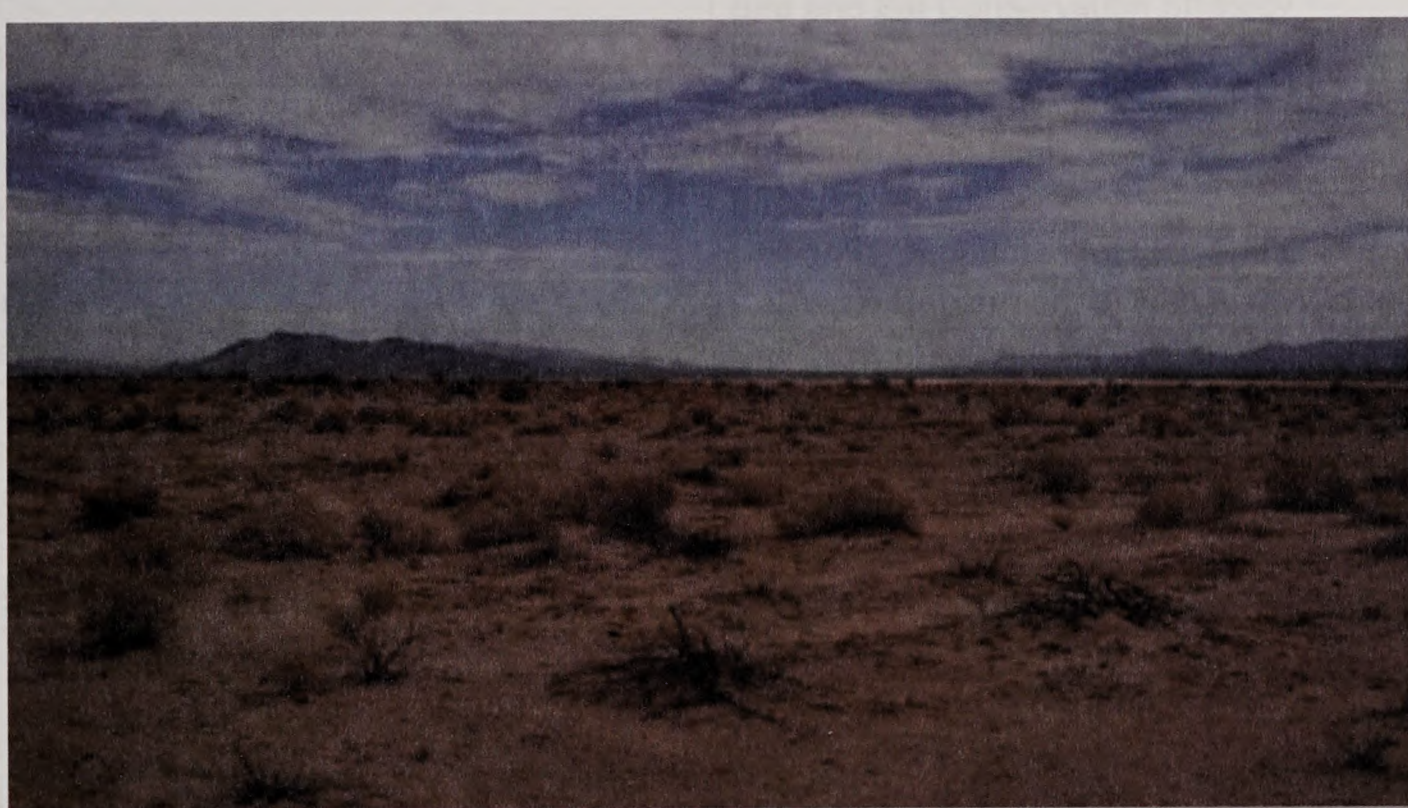
Appendix B-3

Bird and Bat Conservation Strategy

DRAFT

Bird and Bat Conservation Strategy for the Palen Solar Photovoltaic Project



Prepared for

Palen Solar III, LLC

Prepared by:

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415 West 17th Street, Suite 200

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August 21, 2017

WEST Inc.

ACRONYMS AND ABBREVIATIONS

ABPP	Avian and Bat Protection Plan
AGS	Almasol Generating Station
AICc	corrected Akaike Information Criteria
APLIC	Avian Power Line Interaction Committee
APM	Applicant Proposed Measure
BBCS	Bird and Bat Conservation Strategy
BBI	Bloom Biological Inc.
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BUC	Bird Use Count
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
DFA	Development Focus Area
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FG	Fish and Game
GPS	Global Positioning System
km	Kilometer
M	Meter
MBTA	Migratory Bird Treaty Act
MN	Mist Net
MW	megawatts
NEPA	National Environmental Policy Act
PA/FEIS	Plan Amendment/Final EIS
POD	Plan of Development
PSEGS	Palen Solar Electric Generating System
PSH	Palen Solar Holdings
PSPP	Palen Solar Power Project
PV	Photovoltaic
ROD	Record of Decision
ROW	Right of Way
SBC	Small Bird Count
SEIS	Supplemental Environmental Impact Statement
SPUT	Special Purpose Utility Permit
TAG	Technical Advisory Group
USFWS	US Fish and Wildlife Service

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1.0 INTRODUCTION

Palen Solar III, LLC, a wholly owned subsidiary of EDF Renewable Energy (EDF RE), is developing the Palen Solar Photovoltaic Project (Project), which consists of single axis photovoltaic (PV) panel arrays with a net capacity of 500 megawatts (MW). The proposed Project will occupy approximately 4,200 acres (17.0 square kilometers [km^2]) of Bureau of Land Management (BLM) administered land in Riverside County, California (Figure 1). Previously-evaluated projects at the same site include a solar trough thermal energy generating project and a power tower solar thermal energy generating project subject to regulation by the California Energy Commission (CEC).

To monitor and manage Project-related avian and bat injuries and mortalities, the BLM, in consultation with the California Department of Fish and Wildlife (CDFW) and US Fish and Wildlife Service (USFWS), established Conditions of Certification and Mitigation Measure BIO-16 (or SEIS measure WIL-7) that requires the Project to develop a Bird and Bat Conservation Strategy (BBCS), formerly known as an Avian and Bat Protection Plan (ABPP). This BBCS is based on the results of biological resource surveys at the Project and other publicly available information for the area. This BBCS provides a written record of efforts by Palen Solar III to understand potential Project impacts to birds and bats and to document conservation measures that have or will be taken to avoid, minimize, and/or mitigate for those potential impacts.

1.1 Project Background and Description

The location of this Project is the location of the Palen Solar Power Project (PSPP), a solar trough facility, which was licensed by the CEC in 2010, but a Record of Decision (ROD) was never issued by the BLM, and the PSPP was never constructed (CEC 2010; Figure 2).

EDF RE, through its subsidiary Palen Solar III, has applied to amend the ROW Grant application (Case File Number CACA-48810) from the BLM to construct, operate, and decommission a solar PV energy generating facility. The solar facility and generation interconnection line (gen-tie line) are included in the Project, which is proposed to be sited within the previously analyzed PSPP and Palen Solar Electric Generating System (PSEGS) footprints.

The proposed Project will use a single-axis tracking system with PV technologies including, but not limited to, crystalline silicon panels or copper indium gallium selenide panels. The nominal energy output of the Project is proposed to be 500 MW (alternating current). The permanent footprint of the Project will be approximately 4,200 acres, entirely within the footprint of the previously analyzed PSPP. The solar facility site includes the solar arrays, power generating equipment, and support facilities. The linear features include a gen-tie line, distribution line, and a main access road.

The Project will contain all facilities that create a footprint in and around the field of solar panels (solar PV modules), including facilities such as:

- One primary solar field, with two smaller, adjacent solar fields for a total of three solar fields made up of 200 power blocks of electrical generating capacity, including inverters, overhead lines, and access corridors;
- One switchyard;
- One 11 km (7 mile) 220 kilovolt (kV) gen-tie line
- Operations and management facility, potentially off site;
- Other site improvements, such as a temporary laydown area, perimeter and access roads, fencing, water treatment, up to 10 groundwater wells, and lighting;
- Two telecommunications lines (primary and redundant); and
- A main access road from Interstate-10 (I-10)/Corn Springs Road interchange.

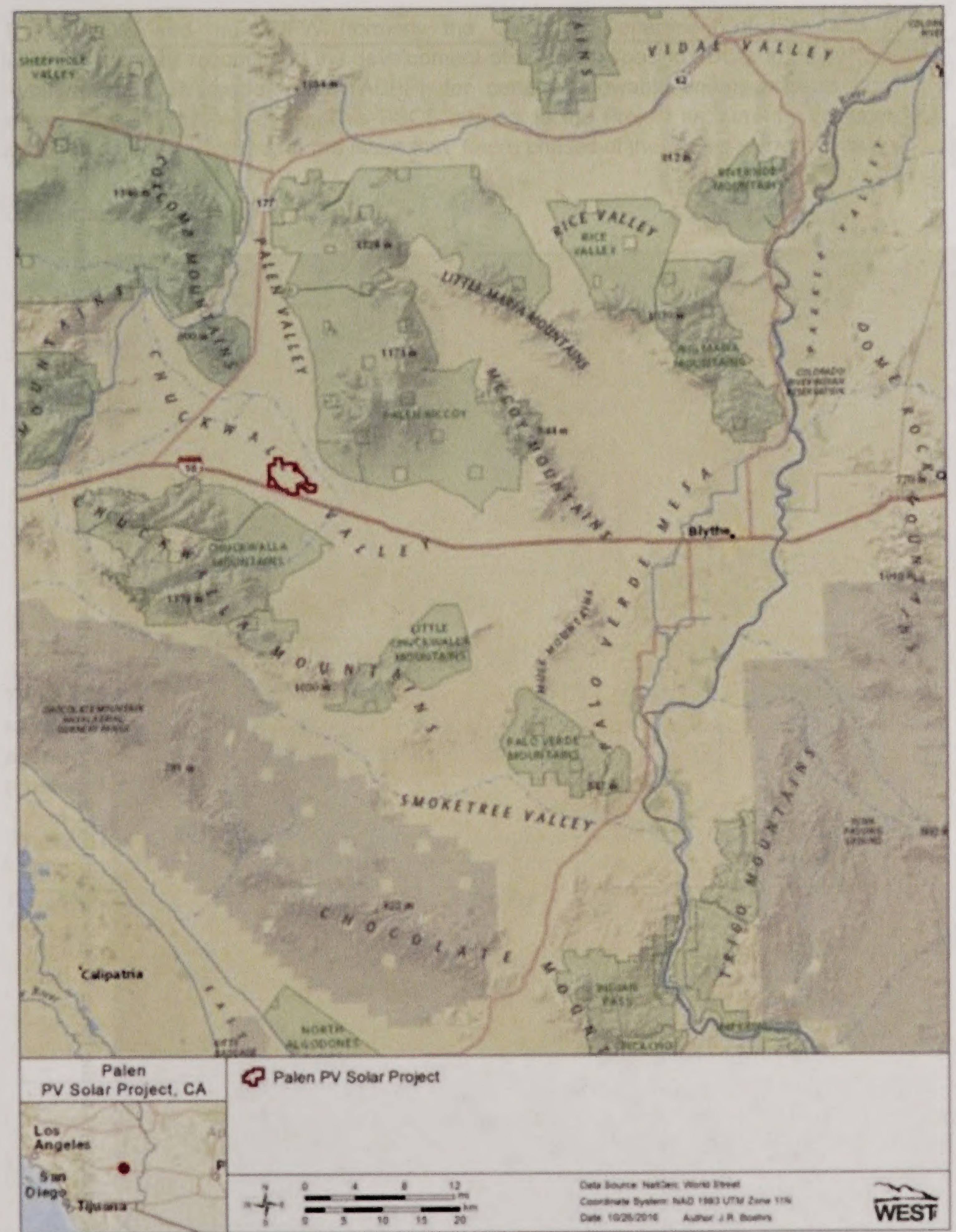

Figure 1. Location of the Palen Photovoltaic (PV) Solar Project.

Figure 2. Footprints of the Palen Photovoltaic (PV) Solar Project and the Palen Solar Electric Generating System (PSEGS) Project.

1.2 BBCS Purpose

The USFWS and the CDFW (formerly the California Department of Fish and Game [CDFG]) currently recommend the development of a project-specific BBCS, formerly called an Avian and Bat Protection Plan (ABPP), for certain renewable energy projects that may impact bird and bat resources. This BBCS applies to the Project as currently designed, but will be updated, as needed, in the event that future phases of the project warrant revisions.

The purpose of this BBCS is to:

- Describe baseline conditions for bird and bat species present within the Project site, including results of site-specific surveys;
- Assess potential risk to birds and bats based on the proposed activities
- Specify conservation measures that will be employed to avoid, minimize, and/or mitigate any potential adverse effects to these species;
- Describe the incidental monitoring and reporting that will take place during construction; and
- Provide details for post-construction monitoring; and
- Specify the adaptive management process that will be used to address potential adverse effects on avian and bat species.

1.3 Regulatory Setting

The Project is subject to all relevant federal, state, and local statutes, regulations, and plans as described in the EIS and Commission Decision. The key federal, state, and local agency approvals, reviews, and permitting requirements for avian and bat species are presented in Table 1.

Table 1. Key avian and bat laws, regulations, and authorizations.

Authorization	Agency Authority	Statutory Reference
Federal		
National Environmental Policy Act (NEPA) Compliance to Grant Right-of-Way	Bureau of Land Management (BLM)	NEPA (Public Law [PL] 91-190, 42 United States Code [USC] Sections [§§] 4321–4347, January 1, 1970, as amended by PL 94-52, July 3, 1975, PL 94-83, August 9, 1975, and PL 97-258, §4[b], September 13, 1982)
Endangered Species Act (ESA) Compliance	US Fish and Wildlife Service (USFWS)	Endangered Species Act (PL 93-205, as amended by PL 100-478 [16 USC §§ 1531, et seq.]); 50 Code of Federal Regulations (CFR) 402
Migratory Bird Treaty Act (MBTA)	USFWS	16 USC §§ 703-711; 50 CFR 21 Subchapter B
Bald and Golden Eagle Protection Act (BGEPA)	USFWS	16 USC §§ 668-668(d)

State		
California Endangered Species Act (CESA) of 1984	California Department of Fish and Wildlife (CDFW)	Fish and Game Code (FG Code) §§ 2050-2098
California Fish and Game Code	CDFW	FG Code §§ 3503, 3503.5, 3511,3513, 4150, 4700, 5050, 5515
California Environmental Quality Act (CEQA)	Riverside County	Pub. Resources Code, § 21000 et seq.

Several federal and state laws and regulations, including National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), BLM Sensitive Species (BLM 2010), and California's Fish and Game Code (FG Code), provide the foundation for the development of this BBCS. This document represents a comprehensive plan to meet the requirements of these regulatory mechanisms as they apply to birds and bats in the Project area.

National Environmental Policy Act

Under NEPA (42 United States Code [USC] Sections [§§] 4321-4370h), federal agencies are required to prepare an EIS for any major federal action significantly affecting the quality of the human environment. The environmental impacts of the Project have been addressed by the Plan Amendment/Final EIS (; BLM 2014). This BBCS corresponds to design features for ecological resources specified in previous licensing documents, which are associated with reducing potential impacts to bird and bat species.

Endangered Species Act

Certain species at risk of extinction, including many birds and bats, are protected under the federal ESA of 1973, as amended. The ESA defines and lists species as "endangered" and "threatened" and provides regulatory protection for the listed species. The federal ESA provides a program for conservation and recovery of threatened and endangered species. Section 7(a)(2) directs all federal agencies to insure that any action they authorize, fund, or carry-out does not jeopardize the continued existence of an endangered or threatened species or designated or proposed critical habitat (collectively, referred to as protected resources).

Migratory Bird Treaty Act

The MBTA (16 USC §§ 703, et seq.), passed by the US Congress and signed into law in 1918, makes it unlawful to "pursue, hunt, take, capture or kill; attempt to take capture or kill; possess; offer to or sell, barter, purchase, or deliver; or cause to be shipped, exported, imported, transported, or received any native migratory bird, part, nest, egg, or product." The MBTA, enforced by the USFWS, protects all MBTA-listed migratory birds within the US. In the continental US, native non-covered species generally belong to the Order Galliformes (i.e., game birds). Common non-native species not protected by the MBTA include rock

pigeon (*Columba livia*), Eurasian collared-dove (*Streptopelia decaocto*), European starling (*Sturnus vulgaris*), and house sparrow (*Passer domesticus*; USFWS 2005). Although permits may be obtained to collect MBTA-listed birds for scientific purposes or to destroy depredating migratory birds, the MBTA does not provide any permit mechanism authorizing the incidental take of migratory birds in connection with otherwise lawful activities. Nevertheless, federal agencies such as the BLM have been directed to evaluate the effects of its actions on migratory birds, with an emphasis on species of concern (per Executive Order 13186).

Bald and Golden Eagle Protection Act

The BGEPA (16 USC §§ 668-668d) prohibits the take, defined as to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb," of any bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*). Through recent regulation (50 Code of Federal Regulations [CFR] § 22.26; USFWS 2009a), the USFWS can authorize take of bald and golden eagles when the take is associated with, but not the purpose of, an otherwise lawful activity and cannot practicably be avoided. The USFWS has issued *Eagle Conservation Plan Guidance* (USFWS 2013) for land-based wind energy projects to help project proponents avoid unanticipated take of bald and golden eagles and comply with the BGEPA. Although the guidelines were developed for land- based wind energy projects, certain components of eagle surveys and monitoring are applicable to other renewable energy projects, including PV solar plants, and have been incorporated into this BBCS.

BLM Sensitive Species

The BLM Sensitive Species are species designated by the State Director and includes only those species that are not already federal or state listed, proposed, or candidate species due to potential endangerment. BLM's policy is to "ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered."

California Endangered Species Act

The California Endangered Species Act (CESA; FG Code §§ 2050-2098 protects and preserves species designated by the Fish and Game Commission as either threatened or endangered in the state of California. These protected resources include those native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, that are threatened with extinction, as well as those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation. The CESA also allows for take that is incidental to otherwise lawful development projects.

California Fish and Game Code

FG Code Sections 3503 and 3503.5 (protection of birds and raptors) – These sections state that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (§

3503) and birds of prey (§ 3503.5), except as otherwise provided by the code or any regulation made pursuant thereto.

FG Code Sections 3511, 4700, 5050, and 5515 (fully protected species) – These state laws classify and prohibit the take of “fully protected” bird, mammal, amphibian/reptile, and fish species in California.

FG Code Section 3513 (migratory birds) – This section prohibits any take or possession of birds that are designated by the MBTA as migratory non-game birds except as allowed by federal rules and regulations promulgated pursuant to the MBTA.

FG Code Sections 4150 (mammals) – This section defines all mammals that naturally occur in California as non-game mammals, with exceptions for those defined as game mammals, fully protected mammals, or fur-bearing mammals. Non-game mammals or parts thereof may not be taken or possessed except as otherwise provided by the code or any regulation made pursuant thereto.

California Environmental Quality Act

Under the California Environmental Quality Act (CEQA) as amended (Public Resources Code [PRC] Section 21000, et seq.), state and local agencies must identify the significant environmental impacts of their actions and avoid or mitigate those impacts, if feasible. The County (Riverside) is the non-federal public agency with the principal responsibility for approving the Project, and as such is the Lead Agency for this project under CEQA.

1.4 Personnel Roles and Responsibilities

Four key roles will be responsible for the implementation of the BBCS, including post construction mortality monitoring: Lead Avian Biologist, Lead Bat Biologist, Avian Biologists, and Biological Monitors. Contingent upon acceptable qualifications, the BLM-approved Designated Biologist(s) may perform these roles and responsibilities.

Lead Avian Biologist

Palen will assign a Lead Avian Biologist to the Project. The Lead Avian Biologist will be responsible for overseeing the implementation of the BBCS and ensuring all monitoring and reporting requirements are met and will be onsite as needed to handle events as they occur. Palen will ensure the Lead Avian Biologist meets the minimum qualifications below and will submit the resume of the proposed Lead Avian Biologist to the BLM and the County for review to confirm that the Lead Avian Biologist meets the minimum qualifications. Palen will also designate an alternate Lead Avian Biologist with the same minimum qualifications as the Lead Avian Biologist, to be reviewed by the BLM. The Lead Avian Biologist and alternate Lead Avian Biologist will have the following minimum qualifications:

- A bachelor's degree in biological sciences, zoology, botany, ecology, or a related field and three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;
- At least one year of field experience with avian resources and/or monitoring in the southwest region.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the BLM and County that the proposed Lead Avian Biologist and alternate Lead Avian Biologist have the appropriate training and background to implement the BBCS effectively. The Designated Biologist (PSPP MM BIO-1), may also serve as the Lead Avian Biologist or alternate Lead Avian Biologist based on qualifications meeting or exceeding those outlined above. The Applicant will ensure that the Lead Avian Biologist performs the activities specified in the BBCS. The Lead Avian Biologist may be the same as the overall site lead given the individual meets the approval of the BLM and the County.

Avian Biologist

The Applicant may designate qualified Avian Biologists to the Project. Avian Biologists will be responsible for conducting fieldwork pursuant to the conservation measures included in the BBCS that require implementation by a trained avian biologist. Field tasks may include species identification for the post - construction avian fatality surveys. Resumes of all proposed Avian Biologists will be submitted to the BLM and the County for review in consultation with the CDFW and USFWS to confirm that they meet the minimum qualifications. Avian Biologists will have the following minimum qualifications:

- A bachelor's degree in biological sciences, zoology, botany, ecology, or a related field;
- At least one year of field experience with avian research and/or monitoring in the southwest region.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the BLM and County that the proposed Avian Biologists have the appropriate training and background to implement the BBCS effectively. The Lead Avian Biologist will ensure that the Avian Biologists perform the activities specified in the BBCS and may assist in the field as needed.

Lead Bat Biologist

The Applicant will assign a Lead Bat Biologist to the Project. The Lead Bat Biologist will be responsible for overseeing the implementation of the portions of the BBCS addressing bat conservation and ensuring all bat-related monitoring and reporting requirements are met. The Applicant will submit the resume of the proposed Lead Bat Biologist to the BLM and the County for review in consultation with the CDFW and USFWS to confirm that the Lead Bat Biologist meets the minimum qualifications. The Lead Avian and Bat Biologist(s) may be the

same individual if they possess the proper qualifications. The proposed Bat Lead will have the minimum qualifications:

- A minimum of one year of field experience with bat resources in the southwest region;
- Demonstrate proficiency at current bat survey and monitoring techniques; and
- Possess at least a bachelor's degree in biological sciences, zoology, botany, ecology, or a related field and three years of experience in field biology or current certification of a nationally recognized biological society.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the BLM and County that the proposed Lead Bat Biologist has the appropriate training and background to implement the BBCS effectively. The Applicant will ensure that the Lead Bat Biologist performs the activities specified in the BBCS. The Lead Bat Biologist may be the same as the overall site lead given the individual meets the approval of the BLM and the County.

Biological Monitors

The Lead Avian and Bat Biologists may designate general Biological Monitors for the Project, as needed. Biological Monitors will have either proven bird or bat identification experience or an appropriate level of oversight by the Lead Avian and Bat Biologists and/or Avian Biologists. Biological Monitors may include solar facility staff if qualified. As appropriate, the Biological Monitors may also be assigned to record observations of special status avian and bat species on the Project site and vicinity, as well as instances of avian or bat mortality. The Biological Monitors may assist with certain avian-related field tasks, such as responding to incidental mortality observations found during construction and post-construction mortality monitoring.

Biological Monitors will be trained in distance-sampling search methodology, identification and documentation of carcasses, implementation of carcass removal trials, and notification of a rehabilitation center in the event of injured birds or bats. Carcasses will be handled in accordance with stipulations in Special Purpose Utility Permit (SPUT). An avian biologist will evaluate all carcass detections to ensure proper species identification. Accurate identification of rare, special status species will be emphasized during training. All surveyors will take photographs of all avian or bat carcass finds. All data collection will be standardized and the approved Avian Biologist will decide which carcasses to report as survey observations; however, all observations that were not conclusive will be reported.

Training

The trainer, curriculum, and training materials for training of non-biologist personnel in monitoring methods will be approved by the BLM and County and will be conducted by the approved Lead Avian and/or Biologist(s), or Avian Biologist(s) under the supervision of the Lead Avian and/or Biologist(s), prior to initiation of the study. Components of the training program will include:

- A classroom-based portion with lecture and handout materials, and photographic or specimen-based (if available) species identification;
- A field-based portion that allows trainees the opportunity to practice and receive feedback on conducting carcass searches and trials, identification of species, completing data forms, and following protocols for assessing and assisting injured birds and bats;
- Assessment of learning outcomes for each participant; and
- A training log to be updated with each trainee's name and contact information upon successful completion of the course. All reference material will be maintained and provided to the agencies in the event that there are questions about species identification.

2.0 PRE-CONSTRUCTION CONSERVATION MEASURES

2.1 Environmental Setting

The Project site is located within the Chuckwalla Valley and is bordered by the Chuckwalla Mountains to the south, the Coxcomb Mountains to the north, and by the Palen Mountains to the northeast (Figure 1). The Palen Dry Lake lies immediately to the north of the site. The topography of the Project is generally flat with no significant terrain features. Elevations within the site range from approximately 134 meters (m; 440 feet [ft]) above mean sea level in the northeast of the site to approximately 207 m (680 ft) in the southwest. According to vegetation mapping conducted for the site by EDAW AECOM (EDAW AECOM 2009a), the dominant vegetative cover type within the Project footprint is Sonoran Creosote Scrub (Figure 3). Several dry desert washes with sparse to moderately dense areas of Desert Dry Wash Woodland are present within and adjacent to the Project (Figure 3). Immediately adjacent to the northwest boundary of the Project is a privately-owned date palm plantation, approximately 530 acres (215 hectares [ha]) in size. Within the privately-owned lands to the northwest of the site are three agricultural ponds, each less than 2.5 acres (1.0 ha) in size.

Figure 3. Vegetative cover types of the Palen Photovoltaic (PV) Solar Project

2.2 Special Status Species

A total of 16 special status bat species and 40 special status bird species were evaluated for the potential to occur at the Project or in the vicinity (Ironwood 2016). Species are listed in Table 2 with state, federal, and Western Bat Working Group (WBWG; bats only) special status designations, and the assessment of potential to occur on the project site.

Table 2. Special status bird and bat species with potential to occur at or in the vicinity of the Project

Species	Status[1]			Potential to Occur on Project Site[2]
	State	Federal	WBWG	
BATS				
Pallid bat *Antrozous pallidus*	SSC	BLMS	H	Foraging - Moderate Roosting - Low
Townsend's big-eared bat *Corynorhinus townsendii*	SSC	BLMS	H	Foraging - Moderate Roosting - Low
Big brown bat *Eptesicus fuscus*	-	-	L	Low
Spotted bat *Euderma maculatum*	SSC	BLMS	H	Low
Western mastiff bat *Eumops perotis*	SSC	BLMS	H	Low
Hoary bat *Lasiurus cinereus*	-	-	M	Foraging - Moderate Roosting - Low
Western yellow bat *Lasiurus xanthinus*	SSC	-	H	Moderate
California leaf-nosed bat *Macrotus californicus*	SSC	BLMS	H	Low
California myotis *Myotis californicus*	-	-	L	Foraging - Moderate Roosting - Low
Arizona myotis *Myotis occultus*	SSC	-	-	Low
Cave myotis *Myotis velifer*	SSC	BLMS	M	Low
Yuma myotis *Myotis yumanensis*	-	BLMS	LM	Low
Pocketed free-tailed bat *Nyctinomops femorosaccus*	SSC	-	M	Low
Big free-tailed bat *Nyctinomops macrotis*	SSC	-	MH	Foraging - Moderate Roosting - Low
Canyon bat *Parastrellus hesperus*	-	-	L	Foraging - Moderate Roosting - Low
Mexican free-tailed bat *Tadarida brasiliensis*	-	-	L	Foraging - Moderate Roosting - Low
Birds				
Golden eagle *Aquila chrysaetos*	CFP, WL	BCC, BLMS	-	Nesting/Wintering - Absent Foraging - Low

Table 2. Special status bird and bat species with potential to occur at or in the vicinity of the Project

Species	Status[1]			Potential to Occur on Project Site[2]
Short-eared owl *Asio flammeus*	SSC	-	-	Low
Western burrowing owl *Athene cunicularia hypugaea*	SSC	BCC, BLMS	-	High
Redhead *Aythya americana*	SSC	-	-	Low
Ferruginous hawk *Buteo regalis*	WL	BCC	-	Moderate
Swainson's hawk *Buteo swainsoni*	ST	BCC	-	Nesting - Low Migration - High
Costa's hummingbird *Calypte costae*	-	BCC	-	Moderate
Vaux's swift *Chaetura vauxi*	SSC	-	-	Nesting - Low Migration - High
Mountain plover *Charadrius montanus*	SSC	BCC, BLMS	-	Nesting - Low Migration - Moderate
Black tern *Chlidonias niger*	SSC	-	-	Low
Northern harrier *Circus cyaneus*	SSC	-	-	Nesting - Low Wintering/Migration - High
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	SE	FT, BCC, BLMS	-	Low
Gilded flicker *Colaptes chrysoides*	SE	BCC, BLMS	-	Low
Black swift *Cypseloides niger*	SSC	BCC	-	Low
Willow flycatcher *Empidonax traillii*	SE	-	-	Low
Southwestern willow flycatcher *E. t. extimus*	SE	FE	-	Low
California horned lark *Eremophila alpestris actia*	WL	-	-	High
Prairie falcon *Falco mexicanus*	WL	BCC	-	Nesting - Low Foraging - High
American peregrine falcon *Falco peregrinus anatum*	CFP	BCC	-	Nesting - Low Foraging - Moderate
Sandhill crane *Grus canadensis*	SSC	-	-	Nesting - Low Migration - Moderate
Yellow-breasted chat *Icteria virens*	SSC	-	-	Low
Loggerhead shrike *Lanius ludovicianus*	SSC	BCC	-	High
Gila woodpecker *Melanerpes uropygialis*	SE	BCC, BLMS	-	Low
Elf owl *Micrathene whitneyi*	SE	BCC, BLMS	-	Low
Long-billed curlew *Numenius americanus*	WL	BCC	-	Nesting - Low Migration - Moderate

Table 2. Special status bird and bat species with potential to occur at or in the vicinity of the Project

Species	Status[1]			Potential to Occur on Project Site[2]
Lucy's warbler *Oreothlypis luciae*	SSC	BCC, BLMS	-	Moderate
American white pelican *Pelecanus erythrorhynchos*	SSC	-	-	Nesting/Wintering - Low Migration - Moderate
Black-tailed gnatcatcher *Polioptila melanura*	WL	-	-	High
Vesper sparrow *Pooecetes gramineus*	SSC	-	-	Low
Purple martin *Progne subis*	SSC	-	-	Low
Vermilion flycatcher *Pyrocephalus rubinus*	SSC	-	-	Low
Ridgway's clapper rail *Rallus obsoletus yumanensis*	ST, CFP	FE	-	Low
Bank swallow *Riparia riparia*	ST	BLMS	-	Nesting/Wintering - Low Migration - Moderate
Sonora Yellow warbler *Setophaga petechia sonorana*	SSC	BCC	-	Nesting - Low Migration - Moderate
Lawrence's goldfinch *Spinus lawrencei*	-	BCC	-	Low
Bendire's thrasher *Toxostoma bendirei*	SSC	BCC, BLMS	-	Low
Crissal thrasher *Toxostoma crissale*	SSC	-	-	Low
Le Conte's thrasher *Toxostoma lecontei*	SSC	-	-	High
Arizona Bell's vireo *Vireo bellii arizonae*	SE	BCC, BLMS	-	Low
Least Bell's vireo *V. b. pusillus*	SE	FE		
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	SSC	-	-	Low

Table 2. Special status bird and bat species with potential to occur at or in the vicinity of the Project

Species	Status[1]	Potential to Occur on Project Site[2]

[1] Status

Federal FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT = Federally listed, threatened: species likely to become endangered within the foreseeable future
FCT = Proposed for federal listing as a threatened species
BCC = Fish and Wildlife Service: Birds of Conservation Concern
State SSC = State Species of Special Concern
CFP = California Fully Protected
SE = State listed as endangered
ST = State listed as threatened
WL = State watch list
CPF = California Protected Furbearing Mammal
CPGS = California Protected Game Species
Bureau of Land Management
BLMS = BLM Sensitive
Western Bat Working Group (WBWG)
H = are imperiled or are at high risk of imperilment
M = warrant closer evaluation, more research, and conservation actions
L = most of the existing data support stable populations

[2] Species not detected during previous surveys may have the potential to occur on the Project site in the future.

2.3 Pre-project Surveying Data

In response to concerns about impacts to wildlife resulting from the development of the Project, a variety of field studies and literature reviews were conducted. In 2009-2010, EDAW AECOM conducted baseline avian and bat studies in support of the original PSPP (EDAW AECOM , 2009a, 2009b; EDAW AECOM and Bloom Biological Inc. [BBI] 2009), which was licensed by the CEC in 2010. In the spring of 2013, baseline studies were initiated for the PSEGS project and its subsequent modifications. These studies were multiple types of avian use surveys, including bird use surveys focused on raptors and vultures, shorebirds/waterfowl surveys at agricultural ponds in the Project vicinity, small bird count surveys, radar surveys to document passage of nocturnal migrants, and mist nest surveys. Surveys for bats included both acoustic surveys and surveys for roosting habitat. Surveys completed at the Project are listed in Table 3 and a brief summary of results are included in the sections below. For a description of the study methods, see Appendix A: Summary of Study Methods for Pre-project Surveys.

Table 3. Pre-construction field survey efforts.

Study	Taxa	Survey Dates	Survey Effort
Bird Use Count Surveys			
			8 hrs/survey
BBI 2013a	Large birds including Raptors, Vultures	April 8– May 4, 2013	6 stations; 762 hrs
BBI 2013b		May 5 – June 1, 2013	6 stations; 192 hrs
Western EcoSystems Technology Inc. (WEST). (Levenstein et al. 2014a,b)		August 20 – December 13, 2013	6 stations; 3,220 hrs
		March 24 – June 05, 2014	2 stations; 666 hrs
(Levenstein et al. 2015)		March 09 – June 05, 2015	2 stations; 785 hrs
Small Bird Count Surveys			
			10 min/survey
EDAW and BBI 2009		April 12 – May 8, 2009	48 stations; 1,920 min
BBI 2013a		April 8 – May 4, 2013	120 stations; 4,790 min
BBI 2013b	Small birds	May 5 – June 29, 2013	186 stations; 12,960 min
WEST (Levenstein et al. 2014a,b)		August 19 – November 14, 2013	150 stations; 19,390 min
		March 24 – June 05, 2014	72 stations; 7,870 min
(Levenstein et al. 2015)		March 16 – June 05, 2015	64 stations; 7,000 min
Mist Net Surveys			
BBI 2013a			12, 12x2.6m nets/survey
BBI 2013b	Small birds	April 11 – May 4, 2013	502.7 mist net hours
WEST		May 9 – June 14, 2013	1,322.4 mist net hours
(Levenstein et al. 2014a)		September 18 – October 30, 2013	1,080 mist net hours
Gila Woodpecker Surveys			
			Concurrent with SBCs
BBI 2013b	Gila woodpecker	April 8 – May 4, 2013	120 stations; 4,790 min
		May 5 – June 29, 2013	186 stations; 12,960 min
Elf Owl Surveys			
BBI 2013b	Elf owl	May 18 – June 15, 2013	143 callback stations 63 listening stations 10 – 14 min/station
Habitat Evaluation for Elf Owl and Gila Woodpecker			
BBI 2013b	Gila woodpecker and elf owl	July 2 – July 19, 2013	29, 50-meter radius Habitat Suitability stations
Golden Eagle Nest Surveys			

Table 3. Pre-construction field survey efforts.

Study	Taxa	Survey Dates	Survey Effort
BBI 2013c		March 20 – April 15, 2013; May 24 – August 3,2013	Surveys by air and ground as per USFWS Guidelines
WEST (Hallingstad 2014)	Golden eagles	April 08 – 12, July 01—03, 2014	Surveys by air and ground as per USFWS Guidelines;
WEST (Levenstein et al. 2015)		March 10 – 19, 2015	Surveys by ground as per USFWS guidelines
Golden Eagle Prey Abundance Surveys			
BBI 2013d	Lagomorphs	April 8 – May 4, 2013 May 5 – June 29, 2013	Concurrent with SBCs 579.69 km of transects 120 stations 186 stations
Golden Eagle Camera Trap and Visual Surveys			
BBI 2013d	Golden eagles	January 23 – February 27, 2013	Camera trap surveys at bait stations and surveys by ground
Burrowing Owl Surveys			
EDAW AECOM 2009b	Burrowing owls	March 10 – June 14, 2009	Per CBOC 1993 Protocol Guidelines and concurrent with desert tortoise survey
Karl 2013		April 7 – June 26, 2013	Per CDFG 2012 Protocol Guidelines
Agricultural Pond Surveys			
WEST (Levenstein et al. 2014a,b)	Shorebirds/ waterbirds/ waterfowl	August 19 – December 10, 2013 March 27 – June 02, 2014	3 stations; 139 hrs 3 stations; 88 hrs
(Levenstein et al. 2015)		March 13 – June 03, 2015	1 station; 96 hrs
Nocturnal Radar Surveys			
WEST (Levenstein and Nations 2014)	Nocturnal migrants	August 19 – October 31, 2013 March – June 2014	1, 3 km radius station 600 hours
Acoustic Bat Surveys			
Brown and Rainey 2013, 2014	Bats	May 11 – 14, 2013	12 survey locations in spring 2013; 989 bat call minutes
		October 7 – December 14, 2013	4 stations in fall/winter 2013; 11,638 bat call minutes

Table 3. Pre-construction field survey efforts.

Study	Taxa	Survey Dates	Survey Effort
Bat Roost Surveys			
EDAW AECOM 2009a Karl 2013	Bats	March 2009 May 11 – 14, 2013 October 7 – December 14, 2013	Targeted visual surveys Analysis of acoustic information to determine potential presence of species with various roosting habits

2.3.1 Bird Use Count Surveys

2.3.1.1 Results

Spring 2013

During the spring of 2013 (April 8 – May 4), a total of 96 BUC surveys were conducted. During this time, 4,399 bird observations were recorded, and 58 unique bird species were identified. Turkey vulture (*Cathartes aura*; 1,701 observations) was the most abundant species observed, accounting for 38.7% of overall observations. A total of 2,734 focal bird (all raptors and other birds larger than an American crow [*Corvus brachyrhynchos*]) observations, representing 14 unique species, were recorded, accounting for 62.2% of overall bird observations. Among the bird types that associate with water, waterbirds (27 observations) and shorebirds (four observations) accounted for less than 0.01% of the observations.

Summer 2013

During the summer of 2013 (May 5 – June 1), a total of 24 BUC surveys were conducted. During this time, 2,492 bird observations were recorded, and 52 unique bird species were identified. Horned lark (*Eremophila alpestris*; 424 observations) was the most abundant species observed, accounting for 17.0% of overall observations. A total of 837 focal bird (all raptors and other birds larger than an American crow) observations, representing eight unique species, were recorded, accounting for 33.6% of overall bird observations. The most commonly observed focal species was turkey vulture (382 observations). Among the bird types that associate with water, waterbirds (two observations) accounted for less than 0.01% of the observations.

Fall 2013

During the fall (August 20 – December 13, 2013) a total of 414 BUC surveys were conducted. During this time, 114,572 bird observations in 4,808 separate groups were recorded, and 75 unique bird species were identified. Turkey vulture (106,379 observations in 1,959 separate groups) was the most abundant species observed, accounting for 92.8% of overall observations. A total of 1,587 individual diurnal raptor observations, representing 14 unique species, were recorded, accounting for 1.4% of overall bird observations. Among the bird types that associate with water, waterbirds accounted for

1.0%, waterfowl accounted for 0.8% shorebirds accounted for 0.4%, and gulls/terns accounted for 0.4% of total observations. See Appendix B for additional details.

Spring 2014

During the spring (March 24 – June 05, 2014) a total of 86 surveys were conducted. During this time, 1,268 bird observations in 545 groups were recorded, and 19 unique bird species were identified. Turkey vulture (694 observations in 271 separate groups) was the most abundant species observed, accounting for 54.7% of overall observations. A total of 157 individual diurnal raptor observations, representing four unique species, were recorded, accounting for 12.3% of overall bird observations. Among the bird types that associate with water, waterbirds accounted for 1.0%, shorebirds accounted for 0.2%, and gulls/terns accounted for 0.2% of total observations; there were no waterfowl observed. See Appendix B for additional details.

Spring 2015

During the spring (March 09 – June 05, 2015) a total of 98 surveys were conducted. During this time, 2,073 bird observations in 545 groups were recorded, and 12 unique bird species were identified. Turkey vulture (1,924 observations in 413 separate groups) was the most abundant species observed, accounting for 92.8% of overall observations. A total of 128 individual diurnal raptor observations, representing seven unique species, were recorded, accounting for 6.2% of overall bird observations during BUC surveys. There were no water- associated bird observations during the spring 2015 BUC surveys. See Appendix E for additional details.

2.3.1.2 Conclusions

The majority of the Project site supports desert scrub vegetation and does not contain the appropriate topography (e.g., ridgelines) known to be used, and in some cases funnel, certain species of medium to large migrating birds (e.g., raptors) through the Project area. The site also lacks other features such as water bodies and large stands of mature trees known to attract certain migrating species (e.g., waterbirds, shorebirds, forest birds, etc.). There are small agricultural ponds (1 mile; 1.6 km) and a small lake (Lake Tamarisk) associated with a golf course nearby (10 miles; 16 km), but the closest major water body is the Salton Sea, which is 34 miles (55 km) southwest of the site, and the irrigated agriculture fields near Blythe, which are approximately 30 miles (48 km) to the southeast. The results of BUC/migration counts by BBI and WEST did not indicate that concentrations of migratory movements of diurnally migrating raptor and water-associated bird species occurred during the study periods; however, there was a relatively substantial movement of turkey vultures through the area during the fall of 2013 and, to a lesser extent, during the spring of 2015. Inferences about the abundance or frequency of nocturnal migrants passing over the Project area cannot be made via the BUC/migration surveys.

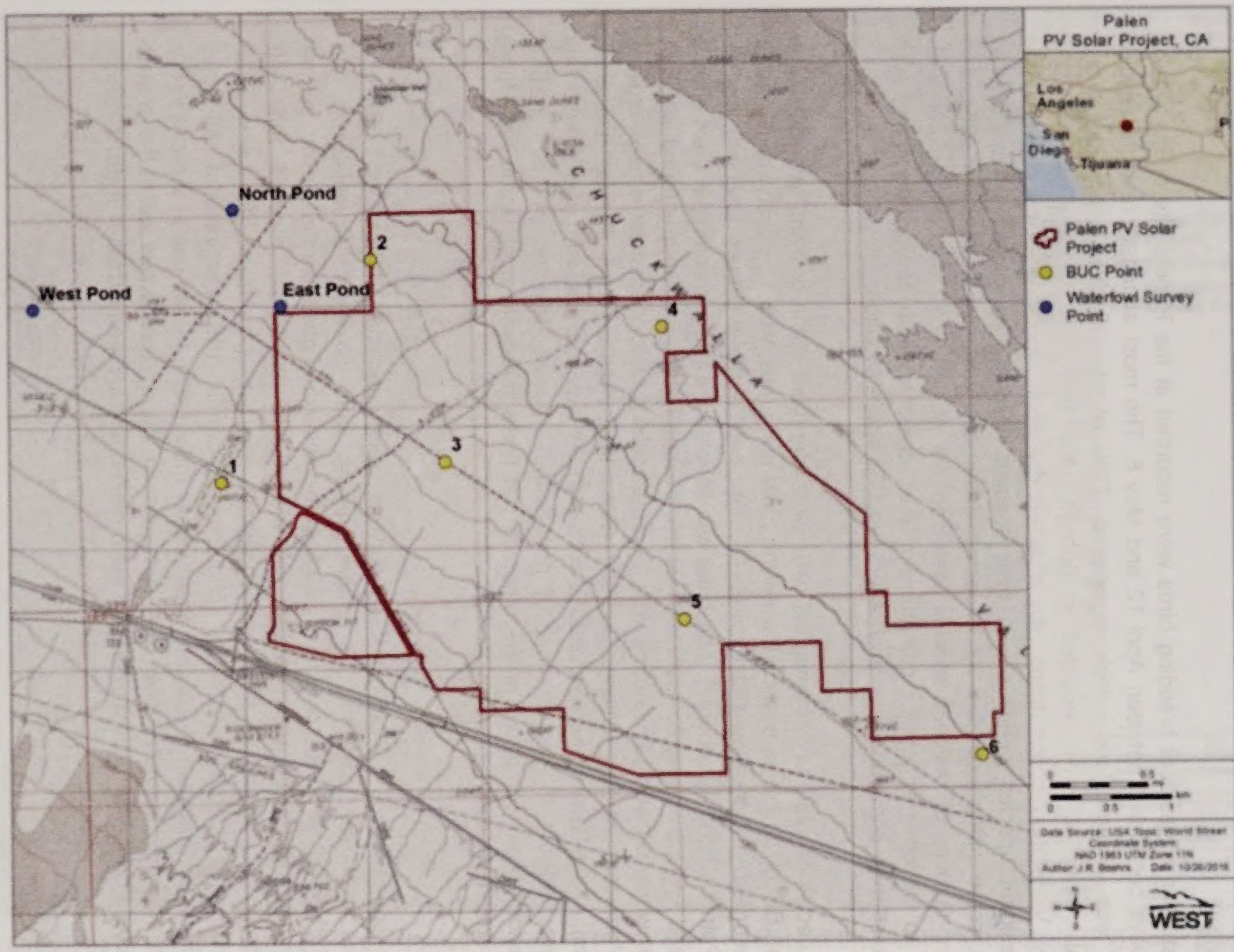

Figure 4. Location of bird use count (BUC) survey points and shorebird/waterfowl survey points at the Palen Photovoltaic (PV) Solar Project.

2.3.2 Small Bird Count Surveys

2.3.1.2 Results

Spring 2009

Thirteen species of resident breeding birds were recorded at the Project site during weekly SBC surveys conducted between April 12 and May 8. The most abundant resident species observed was horned lark, which composed 77% of all individuals recorded during SBCs. All other species recorded composed less than 6% of total observations individually. Vegetation communities with a desert dry wash woodland component had the highest resident species richness with nine species, followed by creosote bush (*Larrea tridentata*), scrub with six species. As expected, desert dry wash woodland communities had the highest number of resident species detected per station (2.63 species/station) when compared to the other vegetation communities (i.e., creosote bush scrub, dunes, dry lake bed, and disturbed communities), which averaged 1.33 species/station.

Thirteen species of migratory nonresident birds were identified within or flying over the survey plots during SBCs. Of these, swallows were the most numerous, with 12 observations of three species recorded: tree swallow (Tachycineta bicolor), barn swallow (Hirundo rustica), and cliff swallow (Petrochelidon pyrrhonota). The latter two species are likely breeding in the vicinity of the proposed Project vicinity; however, no suitable nesting habitat for either is found within the site. These were followed by warblers with 11 observations of four species: orange-crowned warbler (Vermivora celata), Wilson's warbler (Wilsonia pusilla), hermit warbler (Dendroica occidentalis), and yellow-rumped warbler (D. coronata). As expected, desert dry wash woodland communities had the highest number of nonresident species detected per station (2.25 species/station) when compared to the other habitat types (creosote bush scrub and dune), which averaged 0.91 species/station.

Spring 2013

During the spring 2013, 479 10-min SBC surveys were conducted. A total of 1,982 bird observations were recorded and 73 unique species were observed. Cumulatively, five species (6.8% of all species) comprised 50.3% of the individual observations: turkey vulture (308 observations; most seen outside of the 100-m viewshed), horned lark (40 observations), cliff swallow (205 observations), verdin (*Auriparus flaviceps*; 137 observations), and loggerhead shrike (*Lanius ludovicianus*; 106 observations). All other species composed less than 5% of the observations individually. Avian use at stations in dry wash woodland was generally higher than at stations in other habitat types within the project boundary; overall use was highest outside of the project boundary (see exhibit 4 in BBI 2013a).

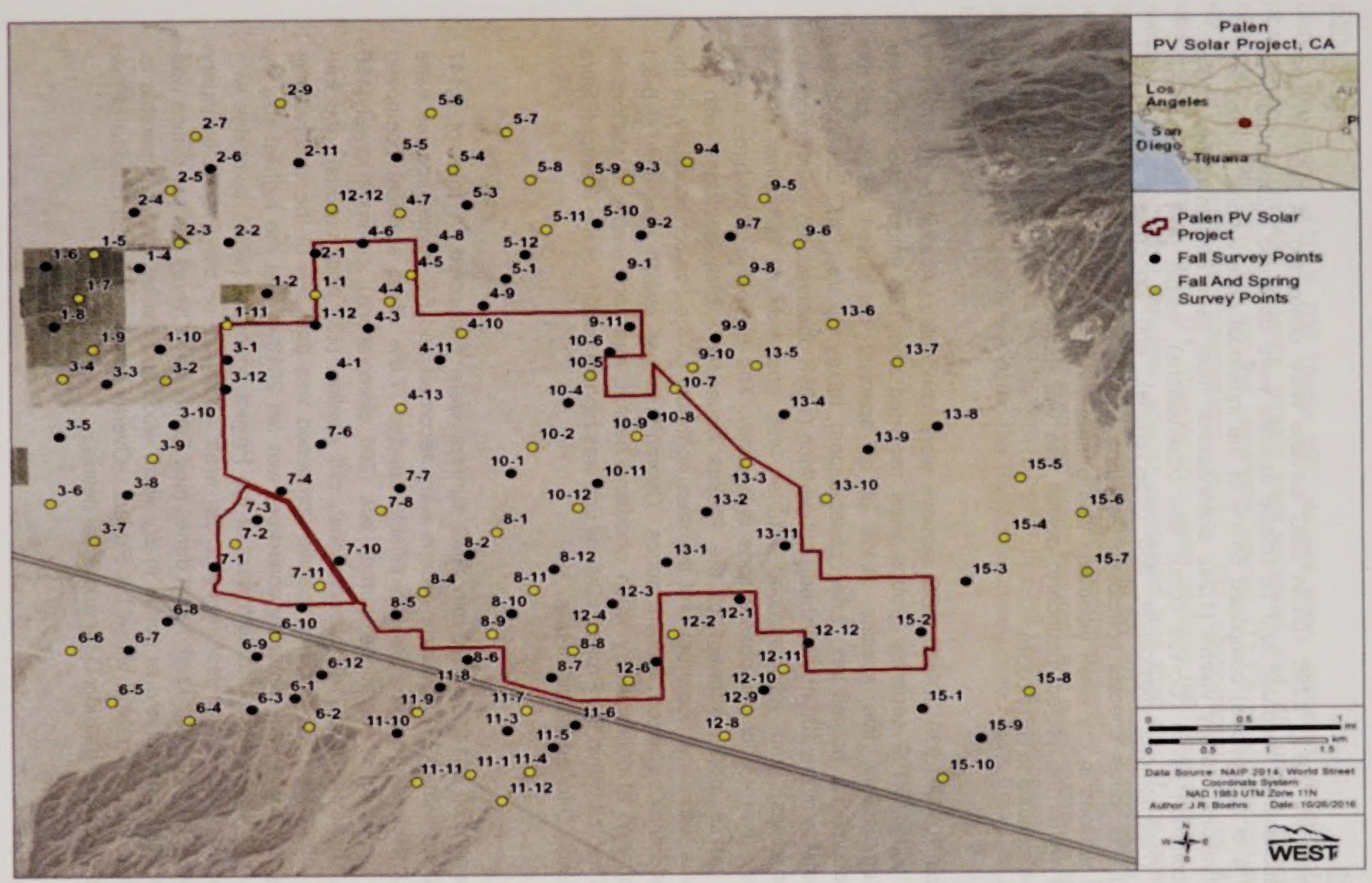

Figure 5. Locations of fall 2013 and spring 2014 small bird count (SBC) survey points at the Palen Photovoltaic (PV) Solar Project. Note: all 150 points pictured above were surveyed during fall 2013, while only 120 of the points were surveyed in early spring 2013, 186 points (36 additional points not depicted above) were surveyed during summer 2013, and only 72 points (yellow, above) were surveyed in spring 2014.

Summer 2013

During the summer 2013, 1,296 10-min SBC surveys were conducted. A total of 6,837 bird observations were recorded and 78 unique species were observed. Cumulatively, six species (7.7% of all species) composed 64.9% of the individual observations: horned lark (1,463 observations), turkey vulture (1,242 observations; most seen outside of the 100-m viewshed), common raven (*Corvus corax*; 584 observations), verdin (424 observations), house finch (*Haemorhous mexicanus*; 365 observations), and loggerhead shrike (358 observations). All other species composed less than 5% of the observations individually. Avian use at stations in dry wash woodland was generally higher than at stations in other habitat types within the project boundary; overall use was highest outside of the project boundary (see exhibit 5 in BBI 2013b).

Fall 2013

During the fall 2013, 1,939 10-min SBC surveys were conducted. A total of 10,072 bird observations within 3,100 separate groups were recorded and 122 unique species were observed. Cumulatively, five species (4.1% of all species) composed 69.6% of the individual observations: horned lark (2,541 observations), turkey vulture (1,877 observations; most seen outside of the 100-m viewshed), house finch (1,098 observations), common raven (1,002 observations), and yellow-rumped warbler (496 observations). All other species composed less than 4% of the observations individually. The highest use by birds overall occurred at points north/northwest of the Project boundary (which coincides with an agricultural area with water features) and the area northeast of the Project boundary in the dry lake bed and stabilized desert dunes. Overall use per station was low (1.5-3.1 birds/station-survey) at points in dry wash woodland habitat, and comparable to stations in other types of habitat within the Project. Overall use was highest outside of the Project (Figure 6a). See Appendix D for additional details.

Spring 2014

During the spring of 2014, 787 10-min SBC surveys were conducted. A total of 2,147 bird observations within 991 separate groups were recorded and 66 unique species were observed. Cumulatively, the top five identifiable species (7.6% of all species) composed 35.4% of the individual observations: horned lark (204 observations), common raven (150 observations), turkey vulture (148 observations), cliff swallow (138 observations), and tree swallow (120 observations). All other species composed less than 5% of the observations individually. Spring 2014 was generally consistent with fall 2013 in that the highest use by birds, overall, was at points north/northwest of the Project boundary (which coincides with an agricultural area with water features) and the area northeast of the Project boundary in the dry lake bed and stabilized desert dunes (see Figure 6a). Overall use per station was low (0.0-3.0 birds/station-survey) at points in dry wash woodland habitat, and comparable to stations in other types of habitat within the Project. Overall use was highest outside of the Project (Figure 6b). See Appendix D for additional details.

Spring 2015

During the spring of 2015, 700 10-min SBC surveys were conducted. A total of 797 bird observations within 492 separate groups were recorded and 45 unique species were observed. Cumulatively, the top five identifiable species (11.1% of all species) composed 49.2% of the individual observations: verdin (121 observations), house finch (79 observations), horned lark (71 observations), barn swallow (66 observations), and tree swallow (54 observations). All other species composed less than 6% of the observations individually. Spring 2015 was generally consistent with fall 2013 and spring 2014 surveys, where the highest use by birds, overall, was at points north/northwest of the Project boundary (which coincides with an agricultural area with water features); and mean avian use at stations in dry wash woodland habitat was generally higher (0.73-3.18 birds/station-survey) than use at stations in other habitat types within the Project boundary (see Figure 6c). See Appendix G for additional details.

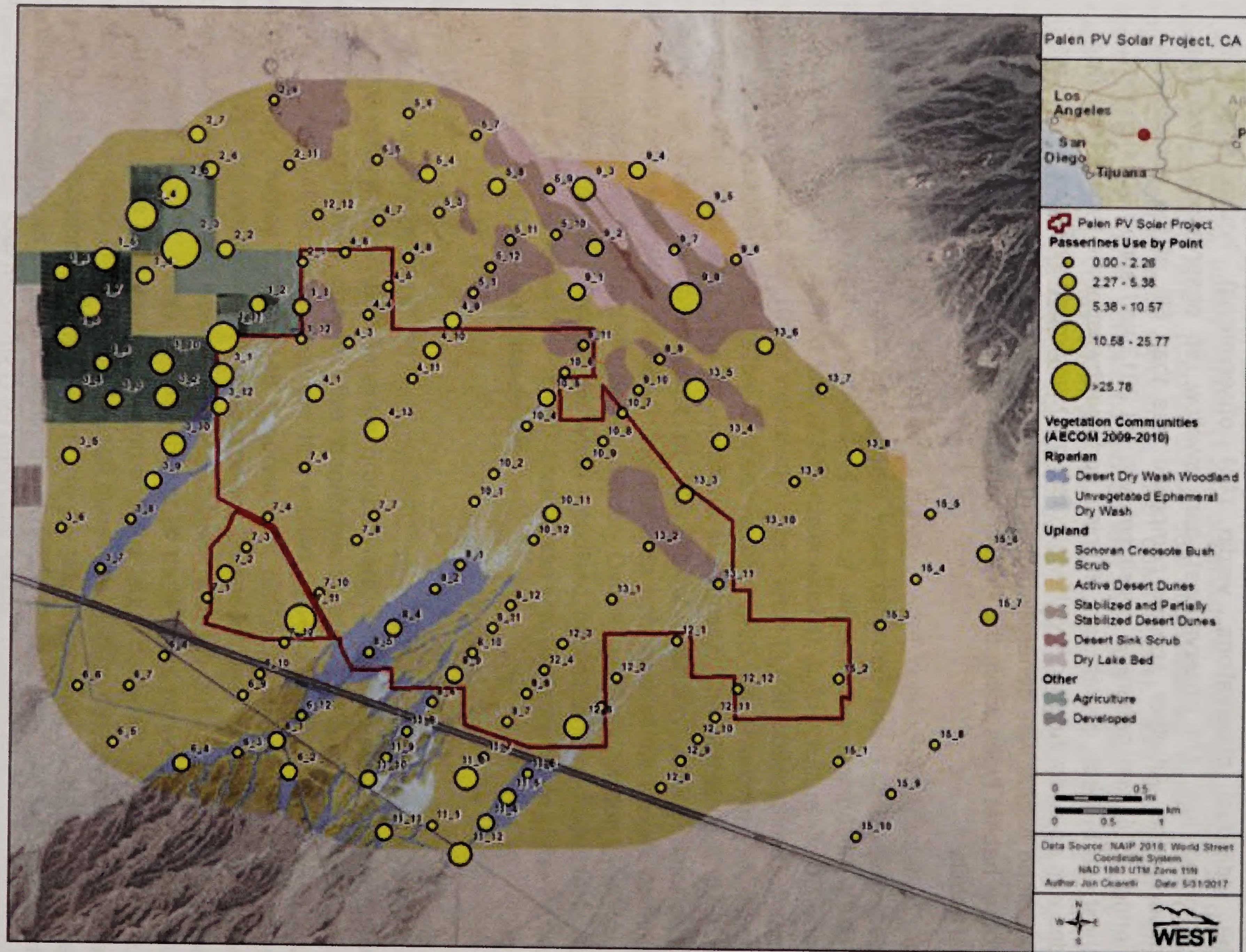

Figure 6a. Bubble plots of overall passerine use (number of birds/observer-hour/survey) by point during small bird count (SBC) surveys at the Palen Photovoltaic (PV) Solar Project, fall 2013.

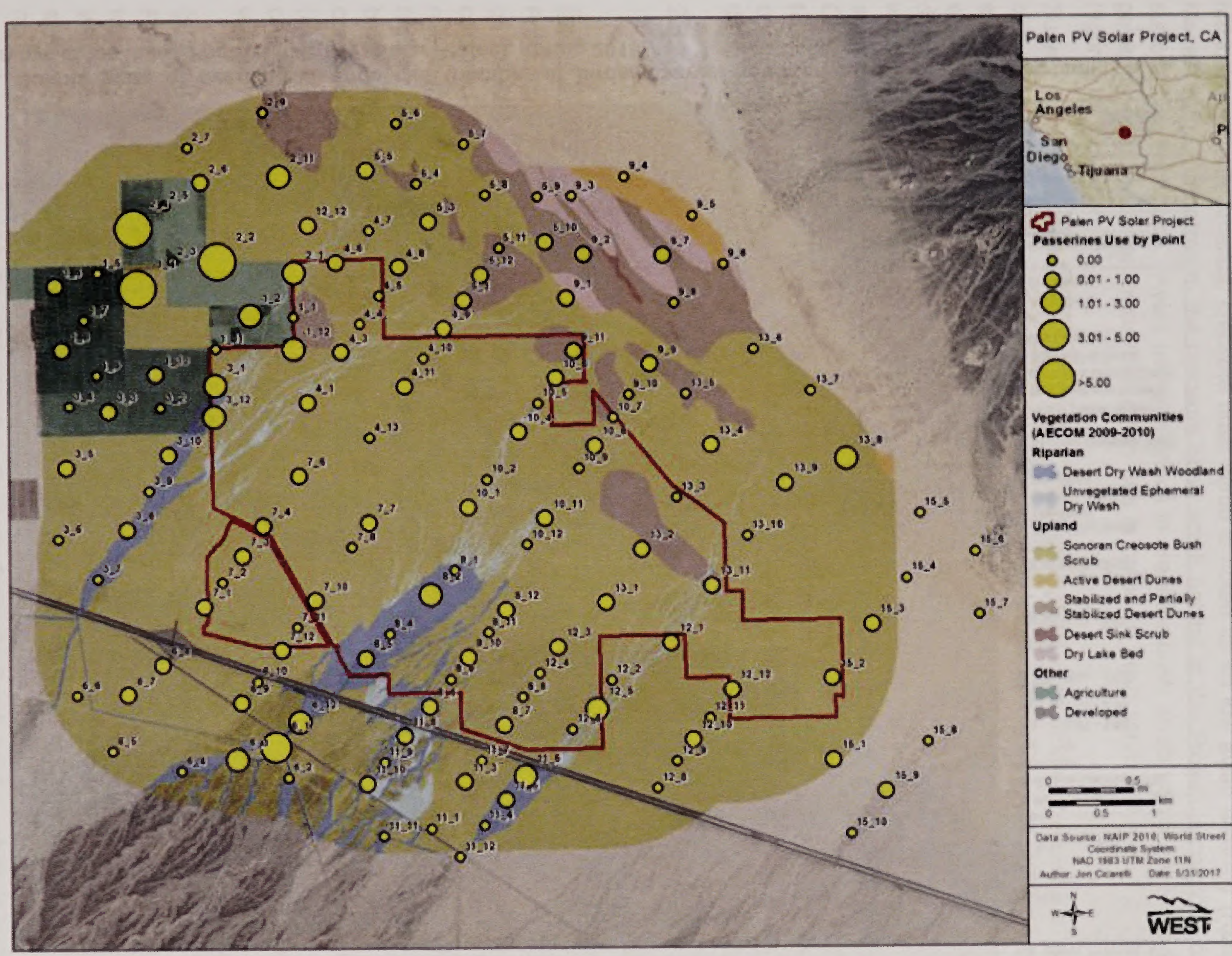

Figure 6b. Bubble plots of overall passerine use (number of birds/observed hour/survey) by point during small bird count (SBC) surveys at the Palen Photovoltaic (PV) Solar Project spring 2014

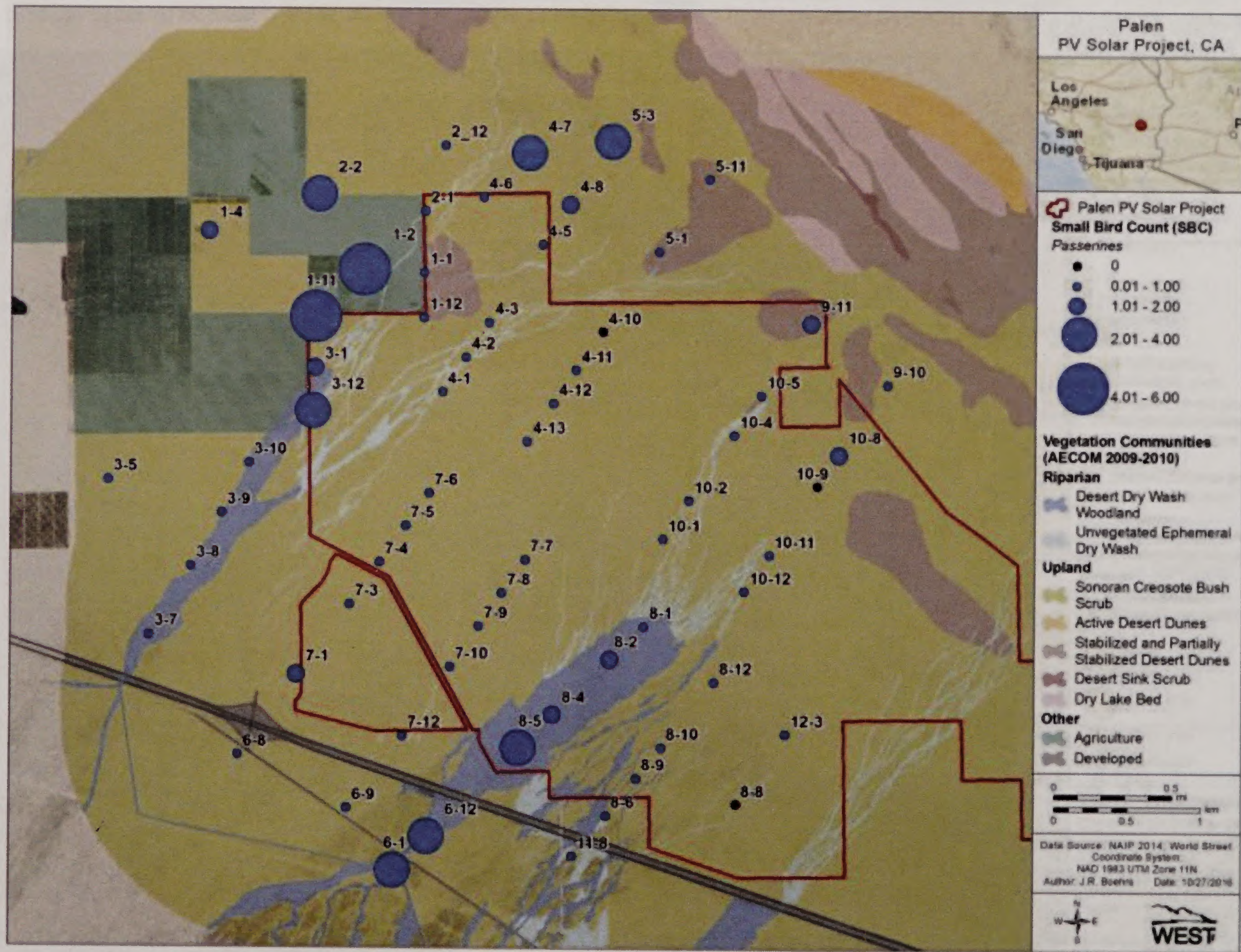

Figure 6c. Bubble plots of overall passerine use (number of birds/observer-hour/survey) by point during small bird count (SBC) surveys at the Palen Photovoltaic (PV) Solar Project, spring 2015.

2.3.1.3 Conclusions

The majority of the Project site supports desert scrub vegetation and among terrestrial habitats in North America, creosote bush scrub is noted for its low avian diversity (Raitt and Maze 1968). Furthermore, the creosote bush scrub habitat at the Project is common on the surrounding landscape. Avian use at stations in creosote bush scrub within the Project was generally comparable or lower than avian use in creosote bush scrub outside of the project (figures 6a, 6b, 6c).

Survey stations located in desert dry wash woodland habitat were among the lowest in overall bird and passerine use and species diversity in fall 2013 and spring 2014 (less than 4 birds / station-survey; Levenstein et. al 2014a, 2014b). During these seasons, use within the Project was low relative to stations outside of the Project (figures 6a, 6b). In contrast, mean bird use during the spring 2015 surveys within the project boundary was highest at the desert dry wash woodland stations (0.01 to 4 birds / station-survey). Overall use during the spring 2015 surveys within the Project was low relative to stations located outside of the Project (figure 6c). Consistent with SBC surveys conducted at the Project previously with similar methods (BBI 2013a, 2013b), the area of greatest use was located outside the north-western boundary of the site close to and within a date palm plantation. This area also includes three small agricultural ponds.

2.3.3 Mist-Net Surveys

2.3.3.1 Results

Spring 2013

From April 11 – May 4, mist net (MN) surveys were conducted for two days per week for a total of 507 MN survey hours. During this period 21 birds, comprising 11 unique species, were captured (BBI2013a). The overall capture rate for the 7-week period was 0.04 captures per net-hour, with daily capture rates ranging from zero to 0.16 captures per net-hour. The highest capture rates occurred at station 8, located within the dry wash woodland, while no birds were captured at stations 2, 6, and 7, all located within creosote scrub. The most common species captured included verdin (seven individuals) and black-tailed gnatcatcher (*Polioptila melanura*, five individuals). All nine other species captured were represented by one individual each. One species captured during this period of MN surveys, hermit warbler, was not recorded during any other type of survey during the spring 2013 effort.

Summer 2013

From May 9 – June 14, MN surveys were conducted weekly, for three days per week for a total of 1,322.4 Standard MN survey hours and an additional 59.8 extra MN survey hours. With roughly equal levels of survey effort, many more individuals (121 versus 26) and species (23 versus seven) were captured at MN stations in the palm plantation located northwest of the Project footprint compared to those in the Desert Dry Wash Woodland habitats on the Project Site (BBI 2013b). Sonoran Creosote Scrub habitat, which is by far the dominant habitat type on the Project site, was not sampled during this MN survey period

because no birds were captured in this habitat during previous MN surveys despite a reasonably large sampling effort, equal to that in Desert Dry Wash Woodland habitats.

The overall capture rate for Standard mist nets was 0.09 captures per mist net hour. The overall capture rate for Extra mist nets was 0.55 captures per mist net hour. During this period, 114 birds comprising 24 unique species were captured in the Standard mist nets and 33 birds comprising 10 unique species were captured in the Extra mist nets. The most common species captured included Swainson's thrush (*Catharus ustulatus*; 22 individuals), verdin (21 individuals), Pacific-slope flycatcher (*Empidonax difficilis*; 16 individuals), and Wilson's warbler (15 individuals). Three species captured during this period of mist net surveys, northern waterthrush (*Parkesia noveboracensis*), yellow-breasted chat (*Icteria virens*), and swamp sparrow (*Melospiza georgiana*), were not recorded during any other type of survey during the spring 2013 effort.

Fall 2013

Fall MN surveys were conducted for three consecutive days per week from September 18 to October 30, 2013, for a total of 1,080 MN survey hours. During this period, 107 birds comprising 25 unique species were captured. The overall capture rate for the 7-week period was 0.10 captures per net-hour, with daily capture rates ranging from zero to 0.51 captures per net-hour. The highest capture rates occurred at station 4, located within the palm plantation, while no birds were captured at station 2, located within creosote scrub. The most common species captured included orange-crowned warbler (*Oreothlypis celata*; eight individuals), white-crowned sparrow (*Zonotrichia leucophrys*; eight individuals), Lincoln's sparrow (*Melospiza lincolnii*; six individuals), ruby-crowned kinglet (*Regulus calendula*; six individuals), and verdin (four individuals). Seven species were captured during MN surveys that were not recorded during any other survey type during the fall 2013 study effort (yellow-green vireo [*Vireo flavoviridis*], warbling vireo [*V. gilvus*], fox sparrow [*Passerella iliaca*], Pacific-slope flycatcher, western wood- pewee [*Contopus sordidulus*], red-naped sapsucker [*Sphyrapicus nuchalis*], and blue-headed vireo [*V. solitarius*]).

2.3.3.2 Conclusions

Using MN surveys, researchers were able to observe/capture 11 species that were not observed/captured during other types of surveys conducted concurrently; however, all 11 of species were observed at mist nets locations outside of the Project footprint. Four of these species, yellow-green vireo, blue- headed vireo, northern waterthrush, and swamp sparrow, are relatively uncommon in Riverside County and generally seen only during the fall and/or spring migration seasons. The yellow-green vireo is extremely uncommon and seen only during a brief window of time in the fall. None of the species are listed as threatened or endangered and none are considered species of concern. The yellow-breasted chat, which was captured during spring MN surveys and not seen during any other spring surveys, is regarded by the CDFW as a species of special concern (CDFW 2016). No mention was made in the BBI report (BBI 2013b) of the bird exhibiting breeding characteristics when it was captured and banded, therefore, this individual was likely migrating through the area to nest elsewhere.

Figure 7. Location of fall 2013 mist net survey stations at the Palen Photovoltaic (PV) Solar Project.

2.3.4 Sensitive Species Observations

Thirty-six sensitive bird species were recorded during surveys conducted between August 19, 2013, and June 5, 2015 (Table 3). One sensitive bird species not previously recorded was observed during spring 2016: the black-tailed gnatcatcher, which is on the California State Watch List (Ironwood 2016). One federally listed (threatened) species was identified during surveys, the snowy plover (*Charadrius nivosus*; CDFW 2013). In addition, six listed or fully protected species in California were recorded (CDFW 2013a, 2013). These included two state-endangered species (willow flycatcher [*Empidonax traillii*] and Gila woodpecker [*Melanerpes uropygialis*]), two state-threatened species (Swainson's hawk [*Buteo swainsoni*] and bank swallow [*Riparia riparia*]), and two fully-protected species (golden eagle and peregrine falcon; Table 3). It should be noted that one subspecies of willow flycatcher, the southwestern willow flycatcher (*Empidonax traillii extimus*), is also a federal-endangered species (CDFW 2013); however, it is unknown which subspecies of willow flycatcher was observed during surveys. Other sensitive species recorded during surveys or incidentally included 18 state-designated species of special concern (CDFW 2016), 10 federal species of concern (USFWS 2008), and six federal priority shorebird species (USFWS 2004). Further, golden eagles are protected under the federal BGEPA (1940), and most bird species recorded during the study are protected under the federal MBTA (1918).

Table 4. Summary of sensitive species observed at the Palen Photovoltaic (PV) Solar Project during bird use count surveys, shorebird/waterfowl surveys, small bird count surveys, mist net surveys, and as incidental wildlife observations from August 19, 2013 – June 5, 2015.

Species	Scientific Name	Status	Flying or Perched Within the Project Boundary
American white pelican	*Pelecanus erythrorhynchos*	SSC	Yes
bank swallow	*Riparia riparia*	ST	Yes
Bell's vireo	*Vireo bellii*	FSC	No
black swift	*Cypseloides niger*	SSC	Yes
black-tailed gnatcatcher	*Polioptila melanura*	SW	Yes
black tern	*Chlidonias niger*	SSC	No
burrowing owl	*Athene cunicularia*	FSC, SSC	Yes
Costa's hummingbird	*Calypte costae*	FSC	Yes
crissal thrasher	*Toxostoma crissale*	SSC	Yes
ferruginous hawk	*Buteo regalis*	FSC	Yes
Gila woodpecker	*Melanerpes uropygialis*	FSC, SE	No
golden eagle	*Aquila chrysaetos*	EA, SFP	Yes
Lawrence's goldfinch	*Spinus lawrencei*	FSC	No
Le Conte's thrasher	*Toxostoma lecontei*	FSC	Yes
loggerhead shrike	*Lanius ludovicianus*	SSC	Yes
long-billed curlew	*Numenius americanus*	FSC, FPS	Yes
Lucy's warbler	*Oreothlypis luciae*	SSC	No

mountain plover	*Charadrius montanus*	FPS,SSC	No
northern harrier	*Circus cyaneus*	SSC	Yes
olive-sided flycatcher	*Contopus cooperi*	SSC, FSC	No
peregrine falcon	*Falco peregrinus*	FSC, SFP	Yes
prairie falcon	*Falco mexicanus*	FSC	Yes
purple martin	*Progne subis*	SSC	No
redhead	*Aythya americana*	SSC	Yes
sandhill crane	*Grus canadensis*	SSC	Yes
short-billed dowitcher	*Limnodromus griseus*	FPS	No
short-eared owl	*Asio flammeus*	SSC	Yes
snowy plover	*Charadrius nivosus*	SSC, FT	No
solitary sandpiper	*Tringa solitaria*	FPS	Yes
Swainson's hawk	*Buteo swainsoni*	ST	Yes
Vaux's swift	*Chaetura vauxi*	SSC	Yes
vesper sparrow	*Pooecetes gramineus*	SSC	No
western sandpiper	*Calidris mauri*	FPS	Yes
willow flycatcher	*Empidonax traillii*	SE	No
Wilson's phalarope	*Phalaropus tricolor*	FPS	No
yellow warbler	*Setophaga petechia*	FSC, SSC	Yes
yellow-breasted chat	*Icteria virens*	SSC	No
yellow-headed blackbird	*Xanthocephalus xanthocephalus*	SSC	Yes
Total	**37 Species**		

ST = State Threatened (CDFW 2013b); FSC = Federal Species of Concern within Bird Conservation Region 33 (USFWS 2008); SSC = State Species of Special Concern (CDFG 2013a); SW = State Watch-list (CDFW 2016); FPS = USFWS priority shorebird species (USFWS 2004); FT = Federal Threatened (USFWS 2008); SE = State Endangered (CDFW 2013a); EA = Bald and Golden Eagle Protection Act (BGEPA 1940); SFP = State Fully Protected Species (CDFG 2011).

Of the 36 sensitive species listed, eight are expected resident breeders (black-tailed gnatcatcher, Costa's hummingbird [*Calypte costae*], loggerhead shrike, crissal thrasher [*Toxostoma crissale*], Le Conte's thrasher [*Toxostoma lecontei*], golden eagle, prairie falcon [*Falco mexicanus*], and burrowing owl [*Athene cunicularia*]). Observations of these species have the potential to occur within the Project during all seasons. Prairie falcon and golden eagle require mountainous cliff habitat (or elevated manmade structures) for nesting, none of which exist within the Project. Mountains to the north and south of the Project site do support habitat necessary for golden eagle nests, as evidenced by the various golden eagle nest surveys (see Section 2.2.7); however, no active eagle nests were recorded within seven miles (11 km) of the site during any surveys between 2010 and 2015. Burrowing owl is found in open habitat, and this species could be expected within or near the Project. The five remaining resident breeders are desert shrub obligates and would be expected to be observed throughout the Project during all seasons. Ferruginous hawk (*Buteo*

regalis), short-eared owl (*Asio flammeus*), northern harrier, and peregrine falcon (*Falco peregrinus*) are migrant species that may pass through the Project during winter months, though overall observations are expected to be low (fewer than 10 per season, based on incidental observations; Sullivan et al. 2009).

Besides Gila woodpecker and golden eagle, all other observed sensitive species are migrants that could be observed using the site during migration, possibly to or from the nearby Salton Sea. Gila woodpeckers are generally sedentary and show only short-distance seasonal movement. This species is known to be expanding its range into the Chuckwalla Mountains and the area around the Salton Sea; most observations (incidental) in the Chuckwalla Mountains have been associated with palm trees in the Corn Springs palm oasis (Sullivan et al. 2009). However, given that the only Gila woodpecker observation was recorded in 2013, greater than one mile from the project boundary, Gila woodpecker is not expected to use the site with any regularity, if at all (BBI 2013a, 2013b).

The federally threatened snowy plover was only observed during the pond surveys, which occurred outside of the Project, during spring 2015 monitoring. The snowy plover is a resident breeder throughout California. Some individuals have been observed to migrate inland during the spring (with associated return migration in the fall). The species is known to be a year-round breeding resident at the nearby Salton Sea (Patten et al. 2003).

The remaining listed species are migrants and not expected to breed or overwinter in the proposed site's vicinity. However, these species are likely to be observed annually as they pass through the area, and could use the area in and around the Project during migration. Some of these migrants are gregarious in nature (e.g., American white pelican [*Pelecanus erythrorhynchos*], Vaux's swift [*Chaetura vauxi*], sandhill crane [*Grus canadensis*]) and can be observed moving in large groups.

2.3.5 Winter 2013 Golden Eagle Surveys

2.3.5.1 <u>Results</u>

A single sub-adult golden eagle was present during all five weeks at bait station 6, feeding on the carcass two to three days each week, usually until the remainder of carcass was taken away at night by coyotes (*Canis latrans*). Although not all adult golden eagles will readily land at carcasses, it is probable that more than one eagle would have been observed over a 4-week period of camera trapping with four to seven stations had high numbers of eagles actually been present in the area. During six full-length visual survey sessions, no eagles were observed within the study area.

2.3.6 2012 and 2013 Regional Desert Surveys

Two regional surveys for raptors, including golden eagles, were conducted in 2012 and 2013 by the BLM (Duerr et al. 2015). In anticipation of the implementation of California's Desert Renewable Energy Conservation Plan (DRECP 2012a), Duerr et al. (2015) surveyed raptor populations within the proposed region. The surveyed region encompassed the entire

proposed Project site. Experienced raptor biologists sampled 24 randomly selected, ground-based transects (each 25.6 km in length) for all raptor species. Each transect was sampled twice – one sample in January 2012 and one sample in January 2013.

Nine observations of individual golden eagles were recorded, for a total of 9 individual observations. From these observations, abundance per 25.6-km transect was calculated at 0.19 (raw) and 0.23 (adjusted for resight probability). Density (eagles per ha) was calculated at 0.000016 (raw) and 0.000022 (adjusted for resight probability). Compared to data collected in 1999, golden eagles populations showed a decrease in density of 0.18 for the region.

2.3.6.1 <u>Conclusion</u>

Winter eagle surveys found definitive evidence for use of the study area by only one golden eagle during the winter months. The results of this study and the 2012 and 2013 regional surveys suggest low eagle winter usage of the Project and surrounding region.

2.3.7 Eagle Nest Surveys

2.3.7.1 <u>Results</u>

Across the entire study area, only a single golden eagle observation was made during spring and summer 2013 golden eagle nesting surveys. This observation was of a third-year golden eagle flying around the cliffs in this southwestern portion of the Palen Mountains during an aerial survey conducted on April 6, 2013. Twelve golden eagle nests were observed in the study area during the surveys. None of these nests displayed any indications of activity during the 2013 breeding season. The locations of all golden eagle nests within the 10-mile buffer of the Project footprint, as well as those of other raptors and common ravens, are illustrated in Figure 8 (BBI 2013c).

During the 2014 surveys, all previously described golden eagle nests were monitored, as well as a number of additional nests. In total, 35 eagle nests were documented during the April and July surveys. None of the nests newly identified in 2014 showed signs of recent activity. Moreover, no golden eagles were observed during aerial or ground-based surveys (see Figure 9).

During the spring 2015 ground-based surveys, 20 previously observed golden eagle nests and one newly discovered nest were monitored. Sixteen nests showed no signs of occupancy, three nest territories were occupied by red-tailed hawks (*Buteo jamaicensis*) in early stages of visiting/refurbishing nests, and two nests were being actively occupied by red-tailed hawks incubating or raising young (Figure 10). The newly identified nest did not show signs of recent activity. In summary, none of the previously-identified golden eagle territories, which were visited in spring 2015, were determined to be occupied by golden eagles.

2.3.7.2 Regional Golden Eagle Nest Surveys

BioResource Consultants Inc. (Latta and Thelander 2013) were contracted by the BLM to conduct aerial and ground-based surveys for known and potential golden eagle nesting habitat within the BLM's California Desert District (CDD), which included the Project site. At the time of the study, the BLM supplied 412 historical golden eagle nest locations. 350 sites were ultimately selected for study, including sites surveyed specifically for the Project in the Palen and Chuckwalla mountains. Latta et al. (2013) performed 167 flight hours of aerial surveys, as well as ground based surveys totaling 30,205 miles (48,610 km), in the vicinity of the 350 previously documented nests. Of the 350 sites surveyed, 256 sites were visited by air, 61 sites by ground, and 33 sites by air and ground; sites were surveyed according to accepted guidelines in Pagel et al. (2010). The surveys identified 74 occupied sites (either by display of courtship, a pair present, or the nest being maintained), of which 44 were active (either incubation, eggs, brooding, chicks, and fledglings). There were no nest sites within 10 miles of the Project found to be occupied.

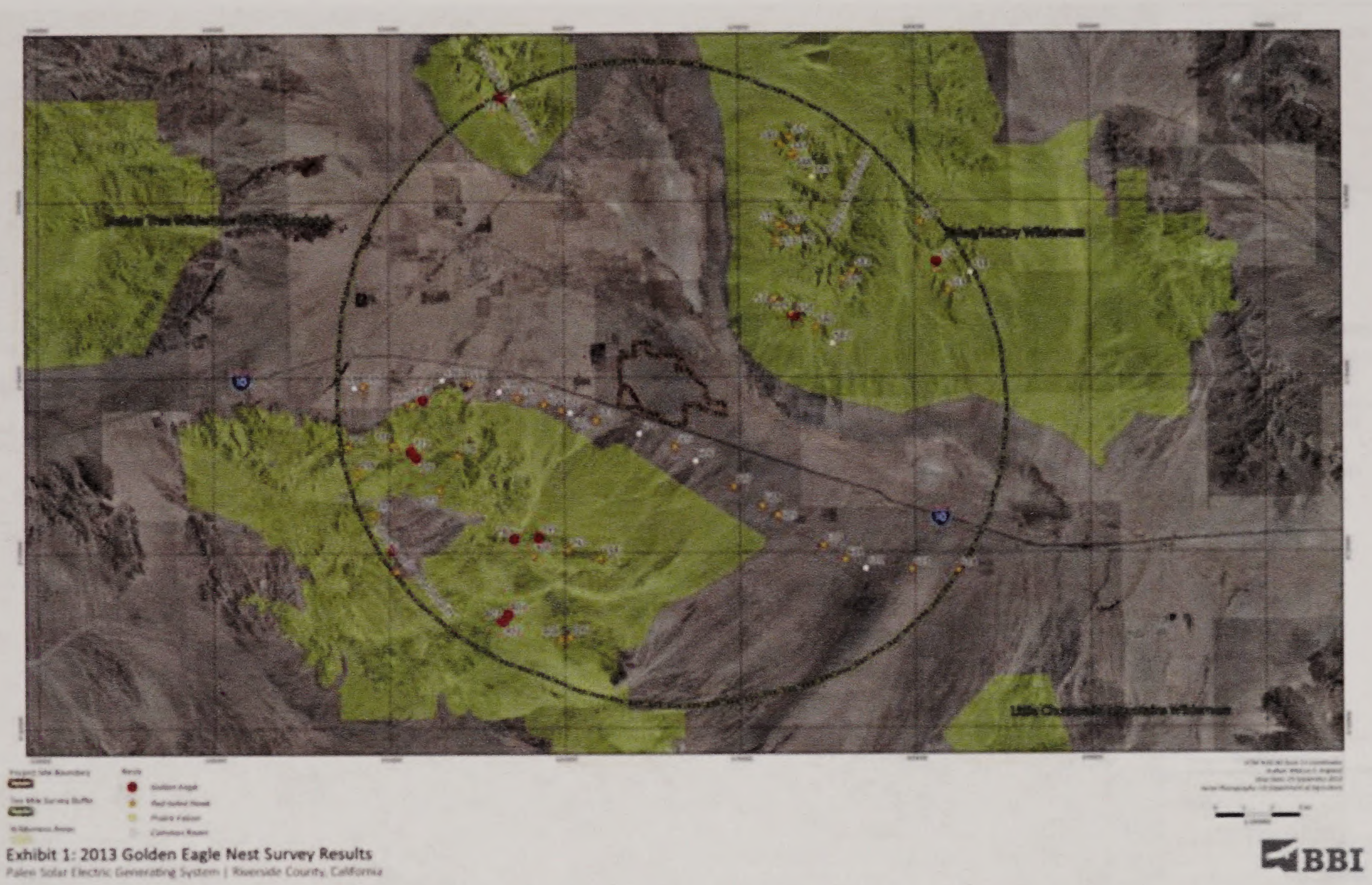

Figure 8. Eagle and other raptor nests located during 2013 eagle nest surveys at the Palen Photovoltaic (PV) Solar Project (BBI 2013c).

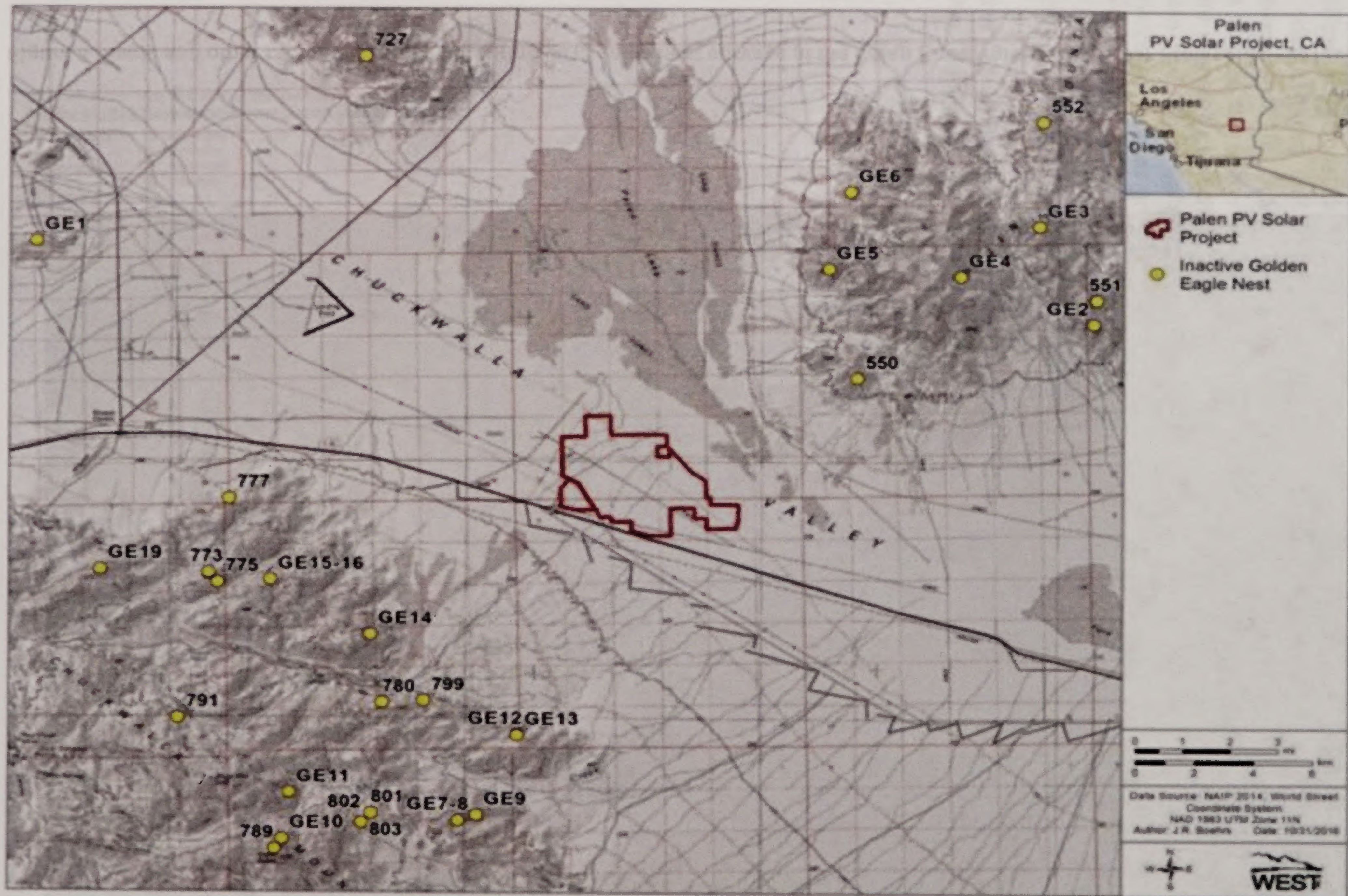

Figure 9. Eagle and other raptor nests located during 2014 eagle nest surveys at the Palen Photovoltaic (PV) Solar Project.

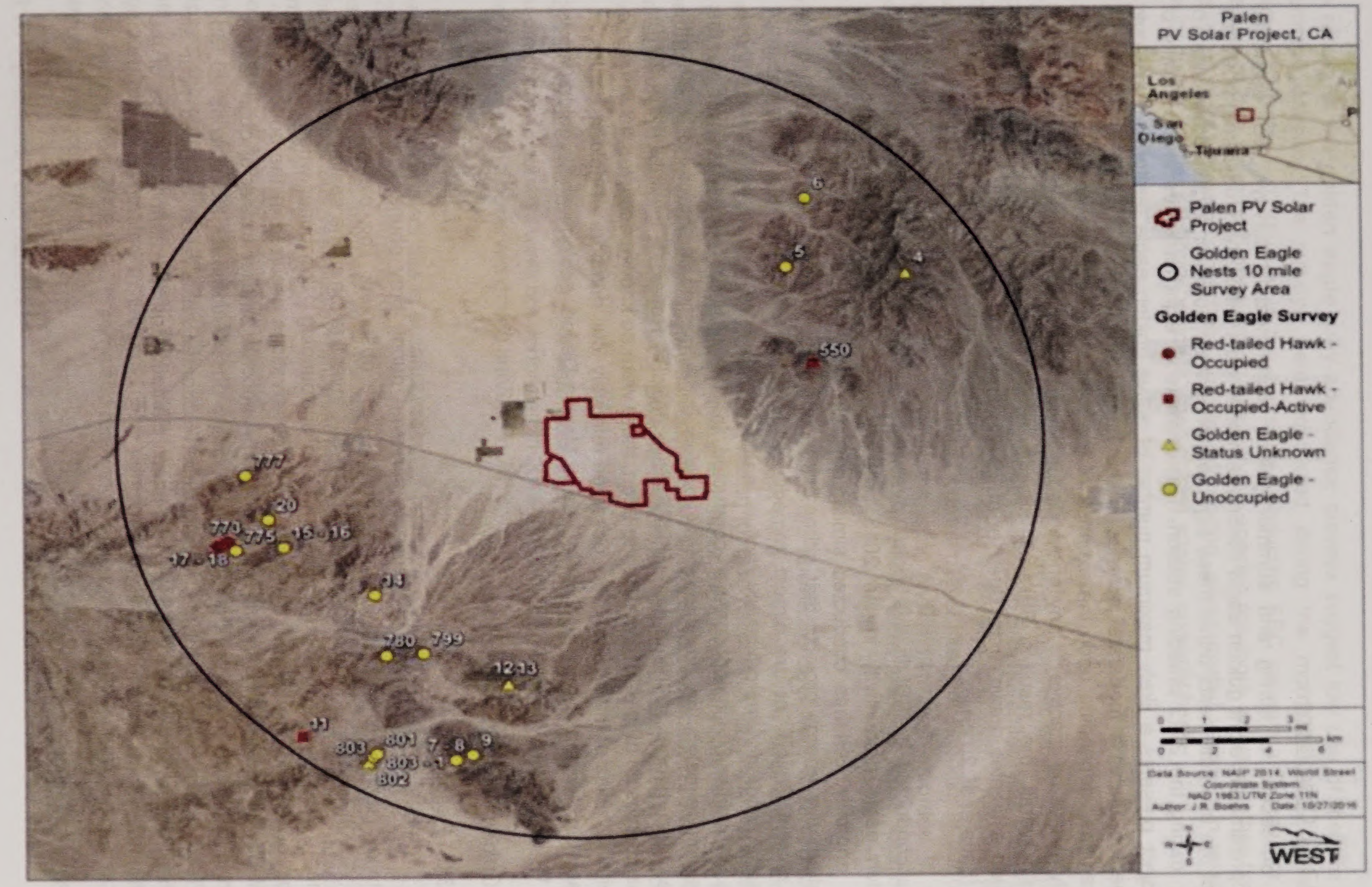

Figure 10. Eagle and other raptor nests located during 2015 eagle nest surveys at the Palen Photovoltaic (PV) Solar Project.

2.3.7.3 Conclusions

Based on results of spring and summer golden eagle nesting surveys, BBI estimated that approximately eight golden eagle nesting territories exist within the study area; however, none of the alternate nests within these eight territories were active or exhibited any signs of activity during the 2013 breeding season. The estimate of eight territories in the vicinity of the Project presents a likely maximum number of active golden eagle territories that would be expected under a moderate increase in the habitat quality in the region. However, in most regions, depending upon the expanse of the area studied, some eagle territories will normally always be inactive in any one year for a variety of natural and perhaps unnatural reasons. Overall, the result of BBI's site-specific work (i.e., low eagle use) aligns with the population estimates drawn from Duerr et al. (2015) and the results of the desert-wide nest survey (Latta et al. 2013).

Surveys conducted by BBI in this region over the previous decade indicate that the lack of golden eagle productivity in the 2013 breeding season in the Project study area is not an anomaly. BBI has conducted similar surveys, with 10-mile radius survey areas at three alternative energy projects that either overlap partially in area with the 10-mile buffer of the current Project, or are almost immediately adjacent to the Project, within the past four years, and no reproductively active eagle nests were discovered during those surveys. In addition, similar surveys conducted in 2010 for four solar projects in the same region revealed the presence of 14 golden eagle nesting territories, of which only one was documented to be reproductively active (Wildlife Research Institute [WRI] 2010). As of the conclusion of the 2015 monitoring effort, there were no known, occupied golden eagle nests within 2 miles of the facility. The observed relatively low numbers of golden eagles at any season in the desert may also be related to Mojave Desert ecology where golden eagle nesting territories are not occupied every year.

2.3.8 Golden Eagle Prey Abundance Surveys

2.3.8.1 Results

Over the 196.5 km (122 miles) of transects surveyed during prey abundance surveys, 17 black- tailed jackrabbits and one desert cottontail were observed. This computes to 0.086 and 0.005 individuals per km of transect, respectively. Investigation of the spatial data reveals two general areas within the Project footprint and surrounding 1-km buffer where nearly all jackrabbit observations occurred. The majority of observations occurred in the southeastern quadrant of the site, both north and south of I-10. A second, smaller cluster of observations occurred in the north-central part of the site, including observations at SBC stations 20, 35, and 37 (see exhibit 2, BBI 2013a). The only desert cottontail observation occurred near an abandoned house along the edge of the palm plantation on the northwest edge of the Project boundary, and close to SBC station 8.

2.3.8.2 Conclusions

The results of the golden eagle prey-abundance surveys suggest low use of the site by lagomorph species. The surveys were conducted during the morning hours (typically between 5:00 am – 11:00 am) in the course of conducting SBC surveys and may not be reflective of true lagomorph densities on-site if these species are more active at other times of day or night. However, the data provide information about spatial variation in relative density during the diurnal hours, which is when golden eagles primarily hunt.

2.3.9 Burrowing Owl Surveys

2.3.9.1 Results

Two nesting pairs of burrowing owls with juveniles were observed within the original PSPP during the spring of 2009 (AECOM 2009). One pair with juveniles was observed using two burrows near the center of the site, and a second pair with juveniles was observed using two burrows near the northwest corner of the site. Four additional burrows with burrowing owl sign were recorded within the site, and a fifth was recorded in the southeast corner of the 150-m buffer area. Follow-up visits were made to these locations, but no burrowing owls were observed.

During supplemental surveys in the spring of 2013, two burrowing owls were observed, both on buffer transects (Karl 2013). No owls or their sign were observed within the linear corridors. One adult burrowing owl was observed during desert tortoise (*Gopherus agassizii*) surveys on April 7 along the 400-m (1,312-ft) buffer transect east of the gen-tie and north of I-10, and a second burrowing owl observation was recorded on May 25 approximately 120 m (394 ft) east of the gas line and north of I-10. Despite a thorough search of both areas, no active burrows were found.

In 2016, five burrows with active sign were observed during transect surveys (Ironwood 2016). Breeding season surveys were not performed in 2016 due to similarity in results from 2009. No burrowing owls were observed during surveys in 2016.

2.3.9.2 Conclusions

The entirety of the Project site is suitable breeding habitat for burrowing owls. During surveys in 2009, two active burrowing owl nests were documented; however, the presence of at least there additional burrows with burrowing owl sign indicate burrowing owl occupancy either during previous years or by wintering owls. Surveys in 2016 results in a comparable number of burrows with sign (5).

The majority of the Project is considered suitable burrowing owl habitat, with numerous burrows potentially suitable for use by burrowing owl (more than 140) observed and mapped throughout the site and the surrounding 150-m buffer (AECOM 2009). Burrows where burrowing owls or their sign were observed were all located in flat, sparsely vegetated areas dominated by creosote. The density of nesting burrowing owls documented during surveys from 2009 to 2016 remained relatively consistent with approximately 4 to 5 active burrows (Ironwood 2016).

2.3.10 Agricultural Pond Surveys

2.3.10.1 Results

Fall 2013

Approximately 139 hours of surveys were conducted over the course of 17 visits to the agricultural ponds. A total of 3,169 bird observations in 754 separate groups were recorded, and 77 unique species were identified. Overall, water-dependent bird taxa (i.e., loons/grebes, waterbirds, waterfowl, shorebirds, gulls/terns, and rails/coots) composed 49.5% of total bird observations. The most frequently observed water-dependent species were eared grebe (*Podiceps nigricollis*; 191 observations), American coot (*Fulica americana*; 165 observations), American avocet (*Recurvirostra americana*; 152 observations), ring-billed gull (*Larus delawarensis*; 89 observations), common goldeneye (*Bucephala clangula*; 89 observations), and ruddy duck (*Oxyura jamaicensis*; 79 observations), which collectively composed 48.8% of all water-dependent bird observations and 24.1% of overall bird observations. The most common species observed during the shorebird/waterfowl surveys was turkey vulture (1,120 observations), which composed 26.6% of all observations. See Appendix C for additional details.

Spring 2014

Approximately 88 hours of surveys were conducted over the course of 11 visits to the agricultural ponds. A total of 1,309 bird observations in 335 separate groups were recorded, and 52 unique species were identified. Overall, water-dependent bird types composed 42.6% of total bird observations. The most frequently observed water-dependent species were least sandpiper (*Calidris minutilla*; 109 observations), Wilson's phalarope (*Phalaropus tricolor*; 96 observations), western sandpiper (*C. mauri*; 77 observations), ruddy duck (56 observations), spotted sandpiper (*Actitis macularius*; 43 observations), American coot (23 observations), and eared grebe (20 observations), which collectively composed 76.1% of all water-dependent bird observations and 32.4% of overall bird observations. The most common species observed during the shorebird/waterfowl surveys was turkey vulture, with 277 observations, which composed 21.2% of all observations. See Appendix C for additional details.

Spring 2015

Approximately 96 hours of surveys were conducted over the course of 13 visits to the agricultural pond survey point. A total of 1,958 observations in 338 separate groups were recorded, and 54 unique species were identified. Overall, water-dependent bird types composed 24.7% of total bird observations. The most frequently observed water-dependent species were American avocet (100 observations), white-faced ibis (*Plegadis chihi*; 78 observations), least sandpiper (46 observations), spotted sandpiper (41 observations), and killdeer (*Charadrius vociferous*; 41 observations), which collectively composed 63.2% of all water-dependent bird observations and 15.6% of overall bird observations. The most common species observed during the shorebird/waterfowl surveys was turkey vulture, with 861 observations, which composed 44.0% of all observations. See Appendix F for additional details.

2.3.10.2 Conclusions

The agricultural ponds provide a ready source of water for birds migrating through or resident in the area. Along with few other small bodies of water in the area (e.g., the Eagle Mountain Pump Plant, located approximately 13 miles [21 km] northwest of the Project, and Lake Tamarisk, located approximately nine miles [14 km] west-northwest of the Project), these ponds represent a rare resource in an otherwise dry desert environment and likely draw birds in from the surrounding area. Together with the irrigated palm plantation and its stands of citrus, this area northwest of the Project footprint represents an unusually hospitable habitat for birds seeking cover and foraging opportunities.

2.3.11 Nocturnal Migration Radar Surveys

2.3.11.1 Results

Mean flight direction was southeast at 133.6 degrees, which is as expected for migrants heading south along the Pacific Flyway. Mean passage rate was 125.64 targets (targets per km per hour [hr]) in horizontal mode; and 562.31 targets/km/hr in vertical mode. Mean flight height of targets was 339.9 m (1,114.9 ft) above radar level (ARL) and approximately 45.3% of targets had flight altitudes less than or equal to the height of the proposed towers of the PSEGS project being considered at the time of the radar study (229 m [751 ft]). Most (approximately 54.7%) of the nocturnal migrants recorded passing over the radar study area (RSA) were flying above 229 m [751 ft].

2.3.11.2 Conclusions

The mean hourly passage rate (targets/km/hr) recorded by radar during the fall study (126 targets/km/hr) was in the 50th percentile of means calculated at available studies in the western US (Table 5). However, it is unknown how passage rates measured via radar may or may not correlate with risk to birds posed by any solar facilities. The original intent of the radar study was to measure nocturnal migrant passage rates to assess risk associated with tall, illuminated structures of the previously proposed PSEGS project, since nocturnal migrant bird fatalities have been detected at tall structures with non-flashing lights (e.g. communication towers, tall buildings; Longcore et al. 2012, 2013, Loss et al. 2014, 2016). The Project has no tall, illuminated structures, thus eliminating risk factors related to those structures.

Table 5. Results of radar studies at proposed and existing wind project sites and one proposed solar project site (Rio Mesa) in the western US, sorted by passage rate (high to low). Passages rates presented are for horizontal mode only.

Site	Passage Rates (targets/km/hr)	Mean Flight Height (m)	Reference
Fall Data			
Collinsville Montezuma Hills (High Winds), CA	464	467	Harvey and Associates 2010
Collinsville Montezuma Hills (Shiloh), CA	407	397	Harvey and Associates 2010
Sagebrush, MT	316	422	Tidhar et al. 2011

Table 5. Results of radar studies at proposed and existing wind project sites and one proposed solar project site (Rio Mesa) in the western US, sorted by passage rate (high to low). Passages rates presented are for horizontal mode only.

Site	Passage Rates (targets/km/hr)	Mean Flight Height (m)	Reference
Hatchet Ridge, CA	290	468	Mabee and Sanzenbacher 2008b
Bear River Ridge, CA	269	329	Sanzenbacher et al. 2007
Rio Mesa, CA	264	374	Levenstein et al. 2012
Coyote Crest, WA	196	454	Mabee et al. 2010
Palen, CA	125.6	339	Levenstein and Nations 2014
Norris Hill, MT	41	209	Harmata et al. 1998
Cotterel Mountain, ID	32	565	Cooper et al. 2004, Bureau of Land Management (BLM) 2006
Nine Canyon, WA	Short range (54.4 slow; 39.6 fast), Long range 10.5	127	Mabee and Cooper 2001, Erickson et al. 2001
Vansycle, OR (2001)	26.3	606	Mabee and Cooper 2004
Stateline, OR/WA (2001)	21.6	647	Mabee and Cooper 2004
Stateline OR/WA (2000)	20.8	NA	Mabee and Cooper 2004
Vansycle, OR (2000)	19.0	NA	Mabee and Cooper 2004
Upper Tanna River Valley, AK (1988)	NA	426	Cooper and Richie 1995
Upper Tanna River Valley, AK (1989)	NA	341	Cooper and Richie 1995
Mean Fall Data[1]	**171.54**	**416.57**	

[1] Excludes PSEGS data. Projects with NA were excluded from means. When multiple values were presented for a single project, those values were first averaged, then their average was used in the seasonal mean for all projects.

2.3.12 Acoustic Bat Surveys and Bat Roost Surveys

2.3.12.1 Results

During the 2009 and 2013 bat roost surveys, only a single roosting bat was observed wedged into the underside of a bridge crossing Corn Springs Road. No other bat roosts were identified. Bridges surveyed in the Project vicinity tended to be smooth cement and provided minimal to negligible roosting habitat (Dr. P. Brown, pers. comm.). Roosting habitat for several tree- and ground-roosting species is present throughout the Project in woodland microphyll habitats and crevices and burrows in the ground.

Table 6. Bat species observed within, or potentially occurring within, the Palen Photovoltaic (PV) Solar Project.

Common Name	Scientific Name	Status (Federal/State)*
High-Frequency (> 40 kiloherts [kHz])		
California myotis**	*Myotis californicus*	-/-
California leaf-nosed bat	*Macrotus californicus*	BLMS/SSC
canyon bat**	*Parastrellus hesperus*	-/-
cave myotis	*Myotis velifer*	BLMS/SSC
Yuma myotis	*Myotis yumanensis*	BLMS/-
Mid-Frequency (30-40 kHz)		
western yellow bat**	*Lasiurus xanthinus*	-/SSC

Low-Frequency (< 30 kHz)		
big brown bat	*Eptesicus fuscus*	-/-
big free-tailed bat**	*Nyctinomops macrotis*	-/SSC
hoary bat	*Lasiurus cinereus*	-/-
Mexican free-tailed bat**	*Tadarida brasiliensis*	-/-
pallid bat**	*Antrozous pallidus*	BLMS/SSC
pocketed free-tailed bat	*Nyctinomops femorosaccus*	-/SSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLMS/C, SSC
western yellow bat**	*Lasiurus xanthinus*	-/SSC
Very Low-Frequency (< 15 kHz		
western mastiff bat **	*Eumops perotis*	BLMS/SSC

*BLMS = Bureau of Land Management Sensitive Species (BLM 2010); SSC = state species of special concern (CDFG 2011); C = state candidate for listing (CDFW 2014).

**Detected during spring/fall acoustic surveys

During the 4-day acoustic survey effort in the spring of 2013, three bats identifiable to species were observed acoustically within the study area: pallid bat, canyon bat (*Parastrellus hesperus*), and Mexican free-tailed bat (*Tadarida brasiliensis*; Table 7). There were a large number of 50 kHz *Myotis* sequences (M50) attributed to a single Myotis species. California myotis is common at low elevations in California deserts and far more common in open habitats distant from surface water than any other *Myotis* species, so all M50 call sequences were interpreted as California myotis (Brown et. al 2013; Table 6). Across the 12 detector locations, a total of 989 identified bat call minutes were recorded for the four nights of the spring study (Table 7. In this relatively low activity sample there were few instances of two different species or sonotypes calling within the same minute at one location, so the value obtained by summing across species and sonotypes is a reasonable representation of relative activity per location. The highest number of call minutes (443) was recorded at Site 10 (Figure 11, the northern-most station located next to a large palo verde tree [*Cercidium floridum*]). Canyon bats were the most common species observed at all stations, followed closely by California myotis. Canyon bats were the earliest observation at most stations and nights, with many recorded approximately 30 min after sunset. Pallid bats and Mexican free-tailed bats were observed less frequently and were not observed at all stations (Table 6). Pallid bats were observed at six of the 12 stations concentrated along the western and northern Project boundaries (Table 6 and Figure 11).

Table 7. Minutes of bat activity per nighta by site and species or acoustic category for acoustic monitoring conducted at the Palen Photovoltaic (PV) Solar Project, May 11-14, 2014.

	Species/Acoustic Category[b]				
Station	**PAHE**	**M50**	**ANPA**	**TABR**	**Q25**
1	7	2	0	0	2
2	8	2	0	0	0
3	17	62	1	0	1
4	12	43	0	1	0
5	8	4	0	1	0
6	22	49	0	0	0
7	25	6	0	0	2
8	70	45	2	1	1
9	52	7	1	0	2
10	171	247	3	2	10

11	78	8	1	0	1
12	11	0	1	0	0
Total	**481**	**475**	**9**	**5**	**19**

[a]Count of 1-min intervals during the night that had at least one identified sequence file for a species or multispecies category

[b]PAHE = *P. hesperus*; M50 = *M. californicus*; ANPA = *A. pallidus*; TABR = *T. brasiliensis*; Q25 = non-diagnostic 25-35 kHz sequences;

During the 6-week fall survey effort in the fall of 2013, at least nine distinct bat species were observed acoustically within the study area (Table 6). This included the same five species/acoustic categories identified during the spring study, as well as an additional three species with call sequences identifiable to species: western yellow bat (*Lasiurus xanthinus*), western mastiff bat (*Eumops perotis*), and big free-tailed bat (*Nyctinomops macrotis*). In addition, several call sequences were attributable to either hoary or pocketed free-tailed bats, but lacked features that would allow identification to species. Both species have the same probability of occurring in the study area in the fall. As is typical of surface water sources, especially in arid areas, the highest number of call minutes and species were recorded at the artificial pond (station 13; Figure 11, Table 7). Canyon bats and California myotis were both common species at all detector locations, with Mexican free-tailed bats observed considerably less frequently. Pallid bats were observed at three stations in the fall and were most abundant at the pond (Table 8). Western yellow bats were observed only at the pond.

Table 8. Minutes of bat activity per night[a] by site and species or acoustic category for acoustic monitoring conducted at the Palen Photovoltaic (PV) Solar Project, October 7 – December 14, 2013.

	Species/Acoustic Category[b]								
Station	PAHE	M50	ANPA	TABR	Q25	LAXA	EUPE	LACI/NYFE	NYMA
3	17	849	0	26	21	0	3	6	0
5	29	13	1	18	12	0	3	7	1
10	208	212	2	8	23	0	1	6	1
13	3,778	4,714	85	69	1,396	93	14	21	1
Total	**4,032**	**5,788**	**88**	**121**	**1,452**	**93**	**21**	**40**	**3**

[a] Count of 1-min intervals during the night that had at least one identified sequence file for a species or multispecies category

[b] PAHE = *P. hesperus*; M50 = *M. californicus*; ANPA = *A. pallidus*; TABR = *T. brasiliensis*; Q25 = non-diagnostic 25-35 kHz sequences; LAXA = *L. xanthinus*; EUPE = *E. perotis*; LACI/NYFE = *L. cinereus* and/or *N. femorosaccus*; NYMA = *N. macrotis*

2.3.12.1 Conclusions

Seven distinct species of bat were observed during the spring and fall studies. Six additional species could be active on the Project site during at least one season, though two (California leaf-nosed bat and Townsend's big-eared bat [*Corynorhinus townsendii*]) have typically low- intensity echolocation signals that may not be readily detectable acoustically even when these species are present and calling. Hoary bats and/or pocketed free-tailed bats were also present, but overlap in call characteristics made species identification between the two impossible. Three special-status bat species are most likely to use the site: pallid bat, California leaf-nosed bat, and Townsend's big-eared bat. Other

special-status bats known from the area (western mastiff bat) may pass through the Project, but this species is an inhabitant of rocky areas, and so would not be considered to be using the site. Some common bat species (e.g., canyon bat and California myotis) could roost in crevices, burrows, or tree cavities on site. Possible impacts to bats would be largely through removal of roosting and/or foraging habitat. Because the Project site does not contain mountainous terrain, direct impacts would be low to species (i.e., pallid bats and canyon bats) that roost in or under objects on the ground (e.g., rocks, woody debris), in crevices in soil, or standing wood. Direct impacts may also include the loss of foraging habitat for several species that roost in the rocky hills adjacent to the Project and in multiple abandoned mines within a 16-km radius of the Project.

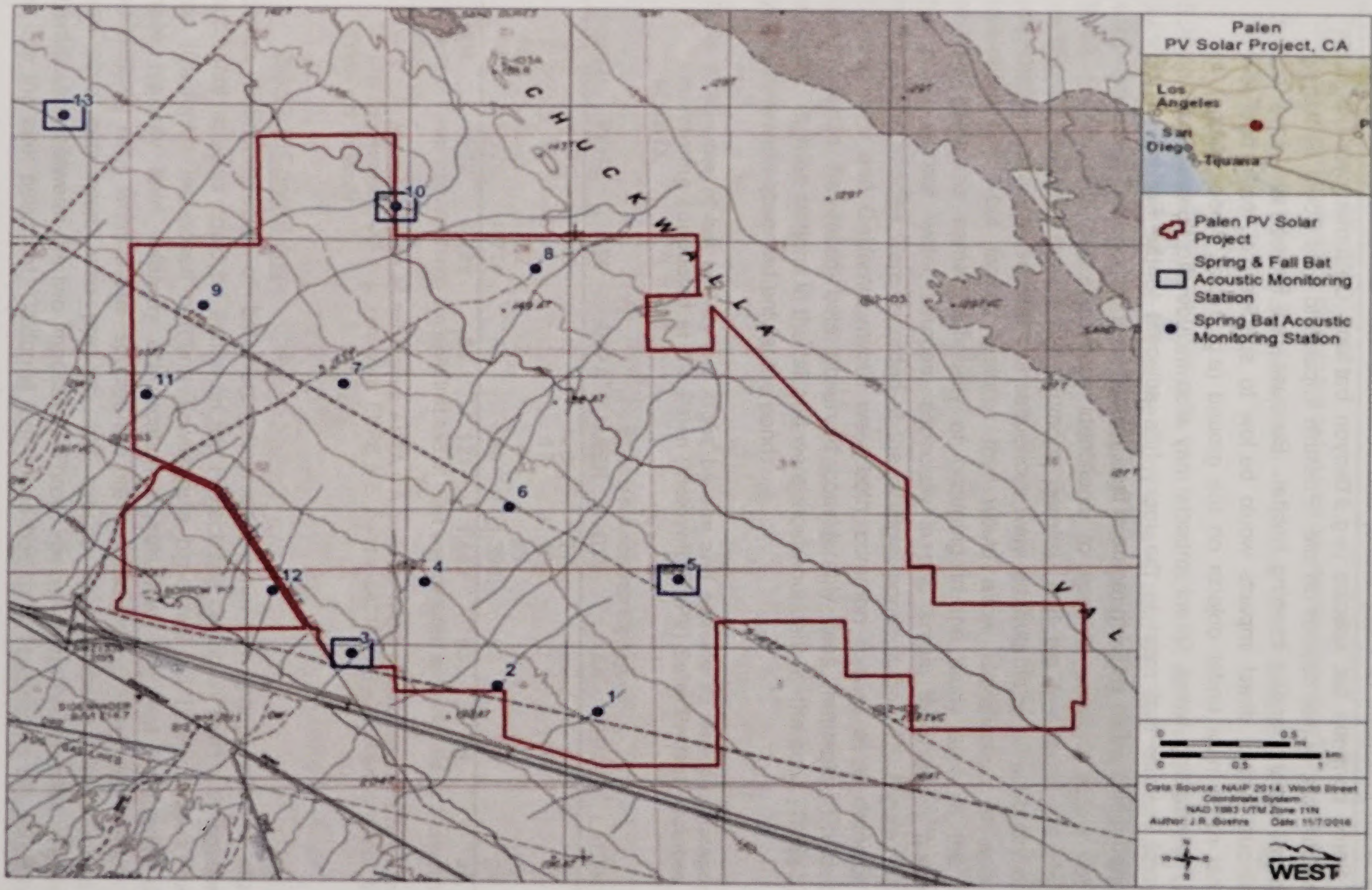

Figure 11. Location of acoustic bat sampling stations. Stations 1-12 shown as blue points were monitored in May 2013, and stations with blue rectangles, including an additional 13th station northwest of the Palen Photovoltaic (PV) Solar Project, were monitored in October – December 2013.

3.0 IMPACTS TO BIRDS AND BATS

The understanding of impacts to birds from the construction and operation of PV solar facilities is an evolving science. There has been a substantial increase in the quantity and quality of monitoring data available from PV solar facilities since 2014, particularly in the desert southwest. As of 2017, there are at least three PV solar facilities with one year or more of standardized fatality monitoring, all in California, and at least four more PV solar facilities which have initiated standardized monitoring within the last year. In the following section we will discuss potential risk factors related to habitat loss, noise, lighting, and direct mortality informed by the most recent publicly available data.

3.1 Specific Risk Factors

3.1.1 Habitat Loss

Construction of the Project will result in habitat loss for avian and bat species within the project boundary. The bird and bat assemblages documented using the Project are typical of the arid Mojave-Colorado desert habitat. A majority of the Project will be constructed in creosote scrub habitat, which has lower avian diversity and abundance during all seasons than other desert habitats (e.g., microphyll woodland) located at or adjacent to the Project site. Approximately 7% (235 of 3,381 acres) of the Project will be constructed in dispersed microphyll woodlands that typically have higher avian diversity and abundance relative to other desert habitats.

3.1.2 Noise

Prior to construction of the Project, ambient noise consists primarily of vehicle traffic on I-10, which lies adjacent to the southern border of the site. Other noise sources include equipment used in association with the palm and citrus plantations to the west of the Project, including generators powering irrigation equipment and more occasional vehicle traffic. During construction, noise impacts will be minimized by avoiding activities that generate over 65 A-weighted decibels (dBA) in nesting habitat between February 15 and April 15, unless the Designated Biologist (DB) provides documentation to the BLM indicating no active nests would be subject to over 65 dBA noise, or nests within range of 65 dBA (or greater) noise are monitored (as required by PSPP Mitigation Measure [MM] BIO-8, or SEIS measure VEG-8).

3.1.3 Lighting

Artificial lighting can be a source of disturbance to birds nesting nearby and may in some instances lead to nest abandonment. Artificial lighting has also been shown in several studies to serve as an attractant when deployed on artificial structures (e.g., communication towers, offshore oil platforms), which can result in night-migrating birds colliding with these structures (Poot et al. 2008, Gehring et al. 2009, Kerlinger et al. 2010). Prior to construction of the Project, sources of light in the vicinity includes traffic along the

adjacent I-10 corridor, as well as lighting associated with the Desert Center Airport, a private facility (5.5 miles [8.9 km] away), the Chuckwalla Valley Raceway (6.25 miles [10.05 km]), the communities of Desert Center (9.0 miles [14.5 km]) and Lake Tamarisk (9.25 miles [14.89 km]), and the Chuckwalla Valley Prison and Ironwood State Prison (16 miles [26 km]), as well as lighting associated with a number of nearby palm and citrus plantations and related buildings. During construction, lighting will include lights from construction vehicles, when and if construction occurs during the overnight hours, lights on structures (e.g., office trailers), parking areas, site security facilities, and possible lighting associated with roads within the Project. Lights will be shielded and focused downward to minimize light exposure outside of the construction areas.

While the Project is in the operations phase, there will be down-shielded lights on buildings, and lights shall be installed and maintained to avoid projecting light on any wildlife habitat. Lighting in high-illumination areas which are not continuously occupied will use timers or motion detectors to ensure these areas are only lit when occupied. The addition of Project lighting in an area that previously had relatively few sources of artificial light could increase the potential for bats to collide with Project infrastructure (Orbach and Fenton 2010, McGuire and Fenton 2010). In addition, as insects may be attracted to artificial light, there exists the potential to increase prey for insect eating bats, further attracting them to the Project and, thereby, increasing the risk of collisions with infrastructure. However, thus far, post-construction monitoring at several projects has resulted in very few bat carcasses being encountered. For example, the Desert Sunlight (DSL) project had no bat fatalities documented during the first year of standardized monitoring (WEST 2016a), but three dead bats were found during construction and the first year of operations. Post-construction mortality monitoring should prove valuable in gaining more insight into this area of interest and adaptive management measures may be enacted to reduce impacts should they become evident.

3.1.4 Direct Mortality

Direct mortality could occur at the Project from several sources including:

- Collision with transmission lines, solar modules, buildings, fences, vehicles and equipment; or
- Electrocution

Although there has been an increase in the understanding of the spatial and temporal patterns of bird fatalities as well as the species that occurred as fatalities, risk factors that drive fatality patterns at solar facilities have not been investigated. Therefore, the number of fatalities at the Project and the occurrence of any specific species as a fatality cannot be predicted from existing fatality monitoring studies; however, patterns in the data can be examined and potential impacts can be inferred within the limits of the data. Thus, to evaluate potential collision risk at the Project, publically available data were reviewed to determine the general habitat associated with each project, the species guild detected (e.g., passerine, raptor, waterbird), and the

proportion of each species guild of the overall total. The objective was to summarize patterns in fatalities and to extend observed patterns at operating solar projects to the Project with a suite of supported underlying assumptions.

As of June, 2017, there were three publicly available studies from utility-scale PV solar facilities with data collected under a standardized monitoring protocol for at least one year: California Valley Solar Ranch (CVSR; H. T. Harvey & Associates 2014), Topaz (Althouse and Meade 2014), and DSL (WEST 2016a). CVSR and Topaz are located in San Luis Obispo County, California, and have rated capacities of 250 and 550 MW, respectively; DSL is located in Riverside County, California, and has a rated capacity of 550 MW. Prior to 2016, CVSR and Topaz were the only two PV solar facilities with at least one year of publicly available, standardized avian fatality monitoring data. Both of these projects are located in a predominantly agricultural and grassland setting approximately 300 mi from the Palen project. In contrast, the DSL project is located in a desert environment approximately 10 mi from the Palen project. Thus data from the DSL project is likely most relevant to inferring fatality risk to birds and bats at the Palen project. For clarity, the term “detection” will be used herein to describe discovery of any carcass, partial carcass, feather spot, or injured birds as part of a standardized search, or an incidental discovery.

Few bat fatalities have been detected during systematic monitoring. For example, no bat fatalities were reported during the first year of standardized monitoring at DSL; three bats were discovered incidentally within the facility prior to initiation of operations, and all three were associated with buildings or fences (WEST 2014b, 2016). No bats were discovered during monitoring at CVSR (H. T. Harvey & Associates 2014). A single bat was detected incidentally at Topaz, however, it was discovered upon opening a shipping container for the first time, and was identified as a non-native species, and thus not attributable to the Topaz project (Althouse and Meade 2014). Although bat fatalities have been rare at a small number of studies at PV facilities, it should be noted that none of those facilities collected bat use data. Thus, it is only possible to infer that if bat use at the three sites discussed herein and the Project are similar, we would expect a similarly low number of bat detections.

During weekly post-construction monitoring at all elements (e.g., arrays, fences, overhead lines, background mortality references sites, and evaporation ponds) of CVSR, there were 368 detections. The most frequent bird type (taxonomic group) observed was passerines (56%), followed by doves and pigeons (30%). Only one water-associated bird detection was discovered (American coot) during the 12-month period analyzed and it was found during standardized searches under the gen-tie line, away from solar arrays. The most frequently found individual species were mourning doves (*Zenaida macroura*; 30%), horned larks (26%), house finches (14%), and western meadowlarks (*Sturnella neglecta*; 7%). There were a total of 4 raptor detections, including one red-tailed hawk (*Buteo jamaicensis*) and two American Kestrels (*Falco sparverius*) among the arrays, and one red-tailed hawk under the gen-tie. Of the 368 detections reported in the study, only 5 were sensitive species with potential to occur at the Project: two burrowing owls (*Athene cunicularia*) among the arrays, one burrowing owl under the gen-tie, and two loggerhead shrikes (*Lanius ludovicianus*) under the gen-tie. Overall, the majority of

detections on regular weekly surveys occurred in the sampled arrays (approximately 55%). An adjusted fatality estimate (using Huso 2011) was only provided for a single array sampling unit, which was monitored for the entire year. Given the relatively small portion of the facility represented by one array sampling unit, it is difficult to interpret an estimate for that sampling unit in the context of an entire facility (e.g. the Project). See H.T. Harvey and Associates (2014) for additional details.

At Topaz, 66 bird fatalities were detected during the 12-month monitoring period analyzed (41 during surveys, and 25 incidental), with carcasses found in construction areas (prior to operations), reference sites outside of the facility, energized arrays, energized power equipment, and linear features (e.g., fences and overhead lines). Six fatalities were domestic chickens (*Gallus gallus domesticus*) from adjacent private land, likely brought into the project by a canid and thus not attributable to the project (Althouse and Meade 2014). Passerines constituted the largest percentage (33%) of the 60 fatalities potentially attributable to the project, followed by corvids (22%) and doves/pigeons (20%). The most frequently found individual species were common ravens (22%), horned larks (20%), and mourning doves (12%). Only 7% (four detections) of the birds found were water-associated birds and those were found in construction areas, along a road, or in a water retention pond. There were no detections of diurnal raptors during the study period. A single burrowing owl (*Athene cunicularia*) was the only sensitive species discovered during the study, with potential to occur at the Project. Of the 41 detections found on regular surveys, 34% of birds were found among arrays, 64% within reference sites, and 2% were found under overhead lines. The monitoring design implemented during the Topaz study precluded the estimation of fatalities adjusted for searcher efficiency, carcass persistence, and searched area using a typical fatality estimator (e.g. Huso 2011); thus, no fatality estimates are presented.

The first year of standardized monitoring at DSL which, like the Project, is situated in a desert habitat at a distance of 10 mi from the Project, was completed in February 2016 (WEST 2016a); 149 avian detections were recorded. Water-associated birds were the most frequently discovered species guild within sampled arrays during standardized searches, with 36 detections (52%), followed by passerines with 16 (23%). The most common water-associated birds observed were grebes (36% of water- associated birds in the arrays including western [*Aechmophorus occidentalis*], eared [*Podiceps nigricollis*], and pied-bill grebe [*Podilymbus podiceps*]), American coot (16%), common loon (*Gavia immer*; 7%), ruddy duck (*Oxyura jamaicensis*; 5%) and sora (*Porzana carolina*; 5%). A single diurnal raptor detection was found during monitoring, a cooper's hawk (*Accipiter cooperii*) among the arrays. There were three detections of sensitive species with any likelihood of occurring at the Project: two loggerhead shrikes (*Lanius ludovicianus*) among the arrays, and one vesper sparrow (*Pooecetes gramineus*) under the gen-tie. Of the 149 detections, 66% were found among arrays, 28% were found under the gen-tie, 2% were found at project buildings, and 5% were found along the fence.

The estimated density of fatalities for the DSL project components within the fence (solar arrays and fence) was approximately 0.19 fatalities/acre/year, or 1.05 fatalities/MW/year,

which translates to an estimated 579 (90% confidence interval 485 - 860) fatalities within the facility during the first year of monitoring. The estimates of water-associated birds and passerine fatalities were nearly the same for the solar arrays (270 and 243 detections, respectively), with an estimated density of 0.07 and 0.06 birds/acre/yea, respectively. Estimates for other species guilds (e.g. doves/pigeons, corvids, etc.) were generally fewer than 10 birds, with the exception of doves and pigeons (22 detections). In other words, despite finding more water-associated bird carcasses or feather spots, the estimated fatalities per acre, per year for water-associated birds was similar to the rates for passerines because most water-associated birds are large-bodied animals that persist longer than small passerines, and are detected at relatively high rates within the solar arrays compared to small songbirds. Along the 20 mile gen-tie line, there were an estimated 1,022 (90% confidence interval 478 – 2,743), or 51 (90% confidence interval 23.9 – 136.7) birds per mile; however, the majority (59%) of detections along the gen-tie were either the result of predation or could not be associated with a specific cause. Given the uncertainty related to cause and the large confidence intervals associated with the gen-tie line estimate, it is difficult to infer the magnitude of gen-tie risk to avian species from the DSL gen-tie estimate, generated from a single year of data.

The most frequently detected species guild differed between the two grassland/agriculture projects and the desert project. At CVSR and Topaz, passerines were the most frequently detected species guild whereas at DSL waterbirds were most frequently detected. Based on the sample of one desert project, it cannot be inferred that the pattern of waterbird fatalities would occur at the Project. However, similarly, it cannot be concluded that waterbird fatalities will not occur at the Project because the correlates of risk for waterbird fatalities have not been studied. The lake effect hypothesis (Kagan et al. 2014) has been suggested to explain past occurrences of waterbird fatalities at PV solar projects, but the hypothesis cannot be used to predict if waterbird fatalities will occur at a newly developed PV project. Based on the patterns observed at all three projects described above, it can be inferred that passerine fatalities will likely occur at the Project, but the number of fatalities cannot be predicted. However, based on the similarity in habitat at DSL and the Palen project, if collision risk is similar between the projects, and bird use or passage through the area are similar, similar numbers of passerine fatalities per MW or per acre could be expected.

3.2 Potential Impacts to Threatened and Endangered Species

No suitable breeding or wintering habitat for bird species that are listed by CESA or FESA occurs within or adjacent to the Project; however, four listed bird species have been incidentally observed at other utility-scale solar projects in California and/or may have the potential to migrate or disperse in the vicinity of the Project (USFWS 2016). These species include:

- Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*);
- Southwestern willow flycatcher (*Empidonax traillii extimus*);
- Least Bell's vireo (*Vireo bellii pusillus*); and
- Ridgeway's [Yuma Ridgway's] rail (*Rallus obsoletus yumanensis* [*R. longirostris y*]).

3.2.1 Observations from Existing Utility Solar Projects

3.2.1.1 Western Yellow-Billed Cuckoo

Western yellow-billed cuckoo detections have been found in or adjacent to desert scrub habitat in the Ivanpah Valley and eastern Riverside County (Davis 2015 personal communication; Beeler 2015 personal communication - as cited in USFWS 2016). The USFWS has noted that the western yellow-billed cuckoo may be susceptible to major storms during migration (79 FR 19860). Two detections of western yellow-billed cuckoos have been noted to date at concentrating solar power facilities in California (USFWS 2016). These records occurred at Ivanpah Solar Electric Generating System, during construction in July 2012, and Genesis Solar Project, during operations in June 2015 (Davis 2015 personal communication; Beeler 2015 personal communication; WEST 2016a - as cited in USFWS 2016). The detection at Ivanpah was found outside of the facility fence, and the cause of death was unknown as site biologists found no evidence of trauma. The detection at Genesis was found in the power block (a facility feature associated with non-PV solar technology, which will not be present at the Project) and cause of death was not stated in the available information.

There is limited information regarding mortalities of western yellow-billed cuckoos at renewable energy facilities outside California (USFWS 2016). No mortalities of western yellow-billed cuckoos have been reported from renewable energy facilities in Nevada (Nicolai 2015 personal communication as cited in USFWS 2016). No mortalities of western yellow-billed cuckoos have been reported from solar PV facilities (Althouse and Meade 2014 [Topaz]; H. T. Harvey and Associates 2014 [California Valley Solar Ranch (CVSR)]; and WEST 2016b).

The closest known breeding habitat to the Project site is located approximately 35 miles away along the Colorado River (USFWS 2016). Migration stopover or dispersal habitat within the breeding range of the cuckoo is not fully understood; however, western yellow-billed cuckoos migrate across the desert and may use scrub habitat during migration (USFWS 2016). There have been no documented sightings of western yellow-billed cuckoos within the DRECP Development Focus Areas (DFAs; USFWS 2016).

3.3.1.2 Southwestern Willow Flycatcher

Willow flycatchers detections have been found at solar facilities and overhead powerlines in the California desert; however, none of the detections were identified as the listed southwestern willow flycatcher (personal communication Guigliano 2015; personal communication Dietsch 2015a; personal communication Dietsch 2015b; EDM International 2016 - as cited in USFWS 2016). There is limited information regarding mortalities of southwestern willow flycatchers at renewable energy facilities outside California (USFWS 2016). No mortalities of southwestern willow flycatchers have been reported from renewable energy facilities in Nevada (personal communication Nicolai 2015 as cited in USFWS 2016).

The closest known breeding habitat to the Project site is approximately 35 miles away along the Colorado River and adjacent to the Salton Sea (USFWS 2016). Southwestern willow flycatchers migrate through the Colorado Desert (USFWS 2016). Migrating willow flycatchers may use a wider range of habitats during migration than during breeding (Craig and Williams 1998 - as

cited in USFWS 2016).

3.3.1.3 Least Bell's Vireo

There have been no reports of least Bell's vireos found dead or injured at renewable energy facilities; however, the USFWS has indicated that such incidents may have occurred but were not detected. (USFWS 2016).

The closest potential breeding habitat to the Project site is over 70 miles to the northwest in the Big Morongo Canyon (USFWS 2016). Least Bell's vireos are also uncommon breeders at the Anza Borrego Desert State Park, located approximately 70 miles southwest of the Project site (USFWS 2016). The subspecies Arizona Bell's vireo (V. b. arizonae) is not FESA-listed, but is CESA-listed as endangered, and is known to occur along the lower Colorado River, approximately 35 miles east of the Project site. Least Bell's vireos likely migrate through the Colorado Desert; however, there is little information on this species' migration behavior (USFWS 2016). It is presumed that this species may utilize patches of riparian habitat varying in size and possibly upland scrub habitat during migration (USFWS 2016).

3.3.1.4 Yuma Ridgway's Rail

Two detections of Yuma Ridgway's rails have been noted to date at solar facilities in California, one at the fixed PV Desert Sunlight Solar Project in Riverside County during construction in 2013 (cause of death unknown) and one at the single axis tracker PV Solar Gen 2 Project in Imperial County in 2014 (cause of death likely due to collision with chain link fence) (USFWS 2016). A live Yuma Ridgway's rail, observed to be uninjured, was recorded at the Blythe Solar PV Project during construction in 2015 (USFWS 2016). There is limited information regarding mortalities of Yuma Ridgway's rails at renewable energy facilities outside California (USFWS 2016). No mortalities of Yuma Ridgway's rails have been reported from known renewable energy facilities in Arizona or Nevada (personal communication Fitzpatrick 2015; personal communication Nicolai 2015 - as cited in USFWS 2016). No Ridgeway rails have been found during the two subsequent years of standardized monitoring at Desert Sunlight, or the first years of monitoring at the Blythe and McCoy projects.

The extent of dispersal or migration between populations is not well known (USFWS 2009b); therefore, is not possible to estimate when the rails would need to disperse with any degree of certainty. Outlier records across the desert (e.g.; Harper Dry Lake, East Cronese Dry Lake, and Desert Center) at great distances from known breeding areas suggest some degree of movement has historically occurred (USFWS 2016). The triggers for movements appear to be the need to find suitable habitat, the need to find mates, and/or the need to locate food (Eddleman 1989 as cited in CEC et. al 2014). Eddleman (1989 as cited in USFWS 2009b) suggested that availability of suitable habitat and food sources, specifically crayfish on the Lower Colorado River may influence the rail's need to disperse. Similar conditions and circumstances may be applicable to the population at the Salton Sea, where a large portion of a recent decline in the population from 2007 to 2014 appears to have been due largely to lack of sufficient water and routine maintenance to support suitable breeding conditions at the Imperial Wildlife Area (USFWS 2009b; personal communication Riesz 2015 - as cited in USFWS 2016).

It is currently presumed that a majority of the Yuma Ridgway's rail on the Lower Colorado River and Salton Sea do not migrate but rather remain in the general area year-round (AZGFD 2001, USFWS 2009b, CEC et. al 2014); however, if the Yuma Ridgway's reaches a population size at which individuals seek suitable habitat outside of the Salton Sea or Lower Colorado River, dispersing rails may seek refuge at area ponds. The potential for transient individuals, particularly dispersing birds, to fly to or over the Project in an attempt to find suitable habitat, over the operational life of the Project, does exist, which could provide an opportunity for transient individuals to be affected.

3.3 Summary of Potential Risks to Bird and Bat Species

Potential risks to listed birds that were initially associated with the previously proposed PSPP and PSEGS included evaporation ponds, entanglement with netting, and solar flux; however, the Project would not involve solar thermal technology, and subsequently, would not involve solar flux, evaporation ponds, netting, or highly reflective heliostats. If listed species were to occur in the Project vicinity, potential impacts include those described in Section 3.0 (Impacts to Birds): habitat loss, noise, lighting, or direct mortality from collisions or electrocution. Additional discussion with regard to listed birds is provided below.

As concluded by the USFWS (2016) assessing all DFAs (over 388,000 acres) within the LUPA, loss of habitat would not likely adversely affect migration of listed species primarily because affected habitat would not include essential breeding habitat (i.e., riparian or marsh), loss of habitat would comprise less than 1% of the total land within the LUPA, and solar facilities would not impose a substantial barrier to individuals during migration or preclude their movement across the desert.

Above-ground infrastructure that may add to collision risk includes solar panels, meteorological towers, power lines, fences, buildings, and large equipment. The Project would consist of PV technology and would not involve collision risks associated with turbines, heliostats, or power towers. Due to their expected rarity of occurrence within the Project vicinity, the potential for listed birds to collide with Project infrastructure would likely be less than other migratory or resident bird species. Electrocution may occur if birds encounter aboveground, electrified powerlines including the gen-tie line; however, with regard to these the four listed birds, electrocution potential is extremely low due to their narrow wing span thus limiting the risk of the birds touching two electrified phases.

Southwestern willow flycatcher, least Bell's Vireo, and yellow-billed cuckoo are known to migrate at night. Yuma Ridgway's rail dispersal behavior is less understood, but this species is also thought to migrate at night. Artificial lighting may serve as an attractant when deployed on artificial structures (e.g., communication towers and offshore oil platforms), which can result in night-migrating birds colliding with these structures (Poot et al. 2008, Gehring et al. 2009, Kerlinger et al. 2010 – as cited in WEST 2017a). During construction, artificial lighting typically includes lights from construction vehicles when and if construction occurs during the overnight hours, lights on structures (e.g., office trailers), parking areas, site security facilities, and possible lighting associated with project roads. During operations, artificial lighting typically

includes lights on buildings and site security facilities.

Three agricultural ponds are located on the date plantation to the northwest with a single operational pond located just over one mile west of the Project. Kagan et al. (2014) and other studies (Argonne and NREL 2015, WEST 2014b) have inferred that the presence of open water ponds in the vicinity of PV facilities having documented waterbird fatalities may have influenced the results, identifying a smaller percentage of water bird mortality at other solar facilities without open water available to waterfowl and shorebirds. Kagan et al. (2014) suggested a link between PV panel-related impact trauma and predation of birds that make their primary habitat on water and Argonne National Laboratory (Argonne) and the National Renewable Energy Laboratory (NREL; Argonne and NREL 2015) further suggested waterfowl that are more dependent on water for their landing surface, such as grebes, coots, and loons, are more likely to be susceptible to collisions with solar panels. Waterfowl may also undergo stress, dehydration, hyperthermia, or predation if unable to take off.

The hypothesis that bird species might interpret solar facilities as water has been proposed by Kagan et al. (2014), Walston et al. (2015), and Huso et al. (2016); thus, further emphasizing the concerns related to injuries and deaths of birds because water-dependent birds may not be able to take off after landing, as they are adapted to take off from water, not dry land, and/or because they may suffer injuries from the collision with solar arrays.

The Project would use a tracking system that would move the solar panels throughout the day, rather than fixed panels as was the case at the Desert Sunlight Solar Project, which may reduce the likelihood of adverse effects resulting from the lake effect hypothesis, should the hypothesis prove correct. A nighttime stow angle (position of the modules) would be similar to the morning position, between approximately 45 and 60 degrees facing east. Modules would never face directly south, which may further reduce the likelihood of adverse effects resulting from the lake effect hypothesis for bird migration occurring in the south-to-north direction.

Ultimately, existing data are inconclusive with respect to supporting or refuting the lake effect hypothesis. Further studies are needed to explore the lake effect hypothesis in terms of the causal mechanisms and how birds perceive solar energy facilities (WEST 2017b). Additional discussion on the lake effect hypothesis is included in the technical memorandum prepared for the Project and attached hereto as Appendix I (WEST 2017b). Data from three publicly available studies at PV solar facilities suggest that avian fatalities were generally distributed across numerous species, typically passerines, doves, and pigeons (Section 3.1.4). No water-associated bird fatalities were discovered among arrays at two of the three sites, CVSR and Topaz (H. T. Harvey and Associates 2014; Althouse and Meade 2014). Water-associated bird fatalities were discovered at the fixed PV Desert Sunlight Solar Project; however, overall estimates of water-associated bird mortality did not differ significantly from estimates of non-water associated bird mortality among arrays (WEST 2016b). Thus, it is difficult to predict how fatalities found at the Project may or may not resemble those found at DSL during the first year.

Limited information is available on the potential for bat collision risk at PV facilities; however, bat carcasses are uncommon at static structures such as communication and television towers (Crawford and Baker 1981). During the construction and early operations phases of DSL, three bat carcasses were found, including a pallid bat, a western mastiff bat, a Townsend's big-eared bat, and a California myotis (WEST 2014b). Cause of death was uncertain for these bats, but the carcasses were not located in the solar arrays; one was located near a transmission tower, another near the perimeter fence, and two near project buildings. No bats were found during the first year of standardized monitoring at the DSL facility. Bat carcasses were not discovered during systematic carcass searches for both birds and bats at the CVSR (H. T. Harvey & Associates 2014) or at Topaz (Althouse and Meade 2014). Although bats did differentiate a smooth metal surface from water in an experiment (Greif and Siemers 2010), the metal plates used in the experiment differ from the substrate and configuration of the solar panels proposed for the Project. Further, Grief and Siemers (2010) did not report bat casualties as part of their study, and bat carcasses could not be attributed to the solar array or were not detected during monitoring at other solar facilities. Thus, based on this limited data, risk associated with collision with the solar panels appears limited.

The predominant habitat type present in the Project site is creosote bush-white bursage (*Ambrosia dumosa*) desert scrub, a widespread habitat type in the Mojave Desert. O'Farrell (2009, 2010) conducted acoustic bat monitoring in similar habitat in the Mojave Desert and found that bat activity recorded over a two-year sampling period was an order of magnitude lower than areas sampled that contained attractant features (e.g., riparian corridors). Thus, the permanent removal of creosote bush-white bursage desert scrub is not expected to represent a loss of high quality bat foraging habitat. Further, as documented by O'Farrell (2009, 2010), 96% of the bat activity was represented by four common and widespread species in the Southwestern US. Thus, the species most likely affected by habitat removal for the Project are common species. As construction will take place during the day, it is not expected that normal bat activity patterns, such as movement between roosting and foraging areas, will be disturbed by construction traffic or noise associated with construction activities.

4.0 CONSERVATION MEASURES

Palen Solar III, LLC has designed the Project and will implement avoidance and minimization measures in the construction and operations phases to avoid and minimize Project-related bird and bat injury and fatalities. Implementation of a number of Conditions of Certification/MM is required to comply with the BLM ROW Grant issued for the Project. To avoid duplication, specific plans pertaining to monitoring, management, and control of resources during construction and operations are referred to within this document.

4.1 Project Design

4.1.1 Utility Poles and Lines

In order to minimize impacts on birds, the utility lines have been designed to prevent bird injury and fatalities due to electrocution. Utility lines will be built following Avian Power Line Interaction Committee (APLIC) Guidelines (APLIC 2012) to minimize electrocution and collision. The APLIC Guidelines include recommended distances that phase conductors should be separated as a minimum of 152 centimeters (cm; 60 inches), or the use of specifically designed avian protection materials in areas where this distance is not feasible (APLIC 2012). The 230-kV transmission line transformers will be more than 152 cm apart, thus minimizing the risk for electrocution of golden eagles and other large raptors. To further minimize impacts to birds, structures will be monopole or dual-pole design versus lattice tower design to minimize perching and nesting opportunities.

4.1.2 Lighting

The Project will be designed to minimize lighting, as required by PSPP MM BIO-8 (SEIS measure VEG-8) and in accordance with Condition of Certification VIS-3. To the extent feasible consistent with safety and security considerations, all permanent exterior lighting and all temporary construction lighting will be designed to minimize night-sky impacts to the extent practicable during construction and operations. In particular: a) lamps and reflectors are not visible from beyond the project site, including any off-site security buffer areas; b) lighting does not cause excessive reflected glare; c) direct lighting does not illuminate the nighttime sky; d) illumination of the project and its immediate vicinity is minimized; and e) the plan complies with local policies and ordinances. Specific design features, as described in PSPP MM BIO-8 (SEIS measure VEG-8), include the following:

- Low-pressure sodium light sources will be used to reduce light pollution.
- Full cut-off luminaires will be used to minimize uplighting.
- Lights will be directed downward or toward the area to be illuminated.
- Light fixtures will not spill light beyond the Project boundary.
- Lights in highly illuminated areas that are not occupied on a continuous basis will have switches, timer switches, or motion detectors so that the lights operate only when the area is occupied.
- Where practicable, vehicle mounted lights will be used for night maintenance activities.
- Where practicable, consistent with safety and security, lighting will be kept off when not in use.

4.2 General Avoidance Measures and Management Practices

The Project will implement several measures to reduce or avoid potential Project impacts on birds and other wildlife during construction and operations.

Speed Limits. To minimize the likelihood for vehicle strikes of wildlife during construction and operations, and the occurrence of carcasses that may attract eagles, ravens, or other

scavengers, a speed limit of 40 km per hour (kph; 25 miles per hour [mph]) has been established for travel on all dirt Project access roads. Signs are posted at appropriate locations (as required by PSPP MM BIO-8, or SEIS measure VEG-8).

Trash Abatement. During construction and operations, all trash and food-related waste is contained in secure, closed lid (raven- and coyote- [*Canis latrans*] proof) containers to reduce the attractiveness of the site to opportunistic predators, such as common ravens and coyotes, and to prevent trash from being exposed or blown around the Project. During construction operations, all trash will be removed on a daily basis (as required by PSPP MM BIO-8, or SEIS measure VEG-8).

Minimize Disturbance Impacts. Equipment and vehicle travel is limited to existing roads or specific construction pathways during construction. Construction traffic, parking, and lay-down areas occur within previously disturbed lands to the extent feasible (as required by MM BIO-8, or SEIS measure VEG-8).

Worker Environmental Awareness Program (WEAP). A site-specific WEAP informs Project personnel about biological constraints of the Project. The WEAP is presented by a Project biologist and all Project personnel must attend the training prior to working on-site. The WEAP includes information regarding sensitive biological resources, restrictions, protection measures, individual responsibilities associated with the Project, wildlife incident reporting procedures, and the consequences of non-compliance. Written material is provided to employees at orientation and participants sign an attendance sheet documenting their participation (as required by PSPP MM BIO-6, or SEIS measure VEG-6).

Minimize Standing Water. The minimal amount of water needed is applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement to meet safety and air quality standards in an effort to prevent the formation of puddles, which could attract birds and other wildlife (as required by PSPP MM BIO-8, or SEIS measure VEG-8).

Dispose of Road-Killed Animals. During construction and operations, road-killed animals or other carcasses detected by personnel within the Project are reported and removed promptly. Appropriate permits are obtained prior to the removal of road kill (as required by PSPP MM BIO-8, or SEIS measure VEG-8).

4.3 Other Avian-Specific Measures

Golden Eagle Monitoring. The potential impacts of the Project on golden eagles will be monitored through annual inventory surveys during construction within two mile of the Project. If surveys indicate that golden eagles are nesting within two mile of the Project, Palen Solar III will produce and implement a Golden Eagle Monitoring and Management Plan per PSPP MM BIO-25 (SEIS measure WIL-11).

Burrowing Owl Relocation and Mitigation. The potential impacts of the Project on burrowing owls will be minimized through the implementation of the Project's Approved Burrowing Owl Relocation and Mitigation Plan (as required by PSPP MM BIO-18, or SEIS measure WIL-9).

Nest Avoidance. For construction that occurs February 1 through July 31, Palen Solar III will conduct nest surveys prior to initiation of construction activities to locate nesting bird species, in accordance with PSPP MM BIO-8, BIO-15, and BIO-16 (SEIS measures VEG-8, WIL-6, and WIL-7). Nest surveys will occur within 4-7 days prior to construction activities. On the day construction/maintenance activities commence, an additional walk-through of the immediate construction/maintenance site will be conducted. If nesting birds are observed, biologists will implement the avoidance measures, as outlined below, and details of which can be found in the Nesting Bird Monitoring and Management Plan:

- If active nests (nests with eggs or young) or suspected active nests are discovered in the construction, the Applicant will establish appropriate buffer distances, as determined by methods set forth in the Nesting Bird Management Plan.
- The DB will monitor the nest until he or she determines that nestlings have fledged and dispersed; activities that might, in the opinion of the DB, disturb nesting activities, will be prohibited within the buffer zone until such determination is made.

Nest Management. Birds may utilize Project facilities for nesting. Any bird nests found will not be touched until the DB is consulted. If a nest is found, the DB will check the nest for activity. Nests that contain eggs or young are considered active and are protected for species listed under the MBTA. Therefore, active nests will be left in place and standard nest buffers will be established consistent with Table 4 (Buffers for Horizontal and Vertical Ground and Helicopter Construction) in *West of Devers Upgrade Project: Nesting Bird Management Plan* (California Public Utilities Commission 2015). Under certain circumstances, nest buffers may be adjusted by the DB after the following factors have been evaluated: species, protected status, nest location, bird behavior, disturbance tolerance, and nature of proposed disturbance. Modified buffers must adequately protect active nests so that nesting activity is not adversely affected by construction or operational activities. The nest buffer will be sufficiently marked in the field.

If the safety of the migratory birds, nest, or eggs is at risk or the migratory birds, nest, or eggs pose a threat to serious bodily injury or a risk to human life, including a threat of fire hazard, mechanical failure or power outage, the Project will consult with the BLM Authorized Officer, CDFW, and USFWS if an active nest or a nest belonging to an eagle or threatened or endangered species is found. Nests that are confirmed to be inactive (i.e., do not contain eggs or young), do not belong to eagles or other threatened or endangered species, and that will cause operational problems, will be removed.

Raven Monitoring, Management, and Control. The risk of attracting common ravens to the Project, which could result in increased predation pressures on prey species, will be

controlled through implementation of the Common Raven Monitoring, Management, and Control Plan (as required by PSPP MM BIO-13, or SEIS measure WIL-5).

Incidental Mortality Monitoring During Construction and Operations. During construction and operations, onsite personnel will notify the DB when an injured or dead bird or bat is observed. The Project will implement a Wildlife Incident Reporting System (WIRS) at the start of construction, and it will remain active for the life of the Project. The purpose of the WIRS is to standardize the actions taken by site personnel in response to wildlife incidents encountered at the Project and to fulfill the obligations for reporting wildlife incidents. The WIRS will be utilized by site operations and maintenance personnel who encounter dead or injured wildlife incidentally while conducting general facility maintenance activities. The WIRS is designed to provide a means of recording and collecting (but only if the appropriate permits such as a SPUT permit have been previously obtained) fatalities at the Project to increase the understanding of solar panel and wildlife interactions. Data collected for detections found via the WIRS will be comparable to that collected during standardized monitoring (see section 5.2.5).

During the standardized post-construction monitoring studies, any carcass found incidentally by site operations and maintenance personnel will be reported to the contractor conducting the post-construction monitoring studies so that the contractor can process the carcass (see Appendix H for example of standard WIRS reporting form). Additionally, injured wildlife found within the Project may be taken to the nearest appropriate wildlife rehabilitation facility (see Section 5.3). Any incident (i.e., mortality or injury) involving a federally listed threatened or endangered species or a bald or golden eagle must be reported to the USFWS within 24 hours of identification. Palen maintains an ongoing commitment to investigate wildlife incidents involving company facilities and to work cooperatively with federal and state agencies in an effort to prevent and mitigate future bird and wildlife fatalities. It will be the responsibility of employees of the Project and subcontractors to report all avian incidents to their immediate supervisor.

After the formal monitoring program has concluded, operations and maintenance personnel will trained and instructed to complete a wildlife incidental reporting form for all injured or dead wildlife that are found on or near Project facilities. This incident form will include, but not be limited to, the following information: date, time, weather, observer, location, habitat description, photographic documentation (including scale), and description of fatality (i.e., condition, any/all observations). Incident reports will be entered into a spreadsheet or searchable database. All incident reports will be reviewed for quality control issues by the site supervisor and periodically by Palen's environmental manager. Upon request, Palen will also periodically provide summary reports of all incidental finds to the USFWS

Standardized Reporting as Requested by USFWS. At the request of USFWS, Palen Solar III will obtain a SPUT Permit and abide by the reporting requirements of the permit.

5.0 POST-CONSTRUCTION MONITORING

This section outlines a standardized approach to document known and projected bird and bat fatalities and injuries, and to estimate seasonal and annual post-construction fatality rates associated with Project features. Post-construction monitoring builds on standards and guidelines developed for the electric-utility and renewable-energy industries to quantify the risk of fatality and injury for birds and bats that may result from interactions with energy-related infrastructure (e.g., Anderson et al. 1999; APLIC 2005, 2006, 2012; CEC and CDFG 2007; USFWS 2010, 2012; Huso et al. 2016b). This section of the BBCS outlines a statistically sound spatial and temporal sampling design, including protocols for independently estimating and correcting for quarterly searcher-efficiency and seasonal (i.e., at least quarterly) scavenger (avian and mammalian) removal rates. It describes specific data to be collected during scheduled carcass searches, protocols for handling any dead or injured birds and bats that are found, and procedures for reporting incidents to relevant government agencies.

5.1 Goals and Objectives

Primary goals of the post-construction fatality monitoring program are to:

1. Estimate overall annual avian and bat fatality rate and species composition associated with the Project infrastructure. This estimate will include mortality associated with solar arrays, overhead lines including the gen-tie, perimeter fence, and other features of the Project that may result in injury and fatality.
2. Determine whether there are spatial and temporal/seasonal patterns of mortality associated with project infrastructure (e.g., different fatality rates near panels on the edge of the arrays versus the interior area of the arrays).
3. Provide information that will assist the BLM, in consultation with the USFWS and CDFW, in understanding which species and potentially which regional populations are at risk.
4. Collect data in such a way that the BLM, in consultation with the USFWS and CDFW, may make comparisons with other solar sites.

These goals are structured in a way that provide information on seasonal differences in fatality rates, and information about which taxonomic groups are most vulnerable. Fatality estimates will be adjusted to address carcass persistence and searcher efficiency as they change through seasons. Additionally, carcass persistence trials will inform search intervals.

Consistent with the above goals, the specific objectives of post-construction monitoring are as follows:

1. Conduct fatality searches for a minimum of two years according to a spatial and temporal sampling plan that provides representative and statistically sound coverage of the solar arrays, consistent with monitoring required of other industries. The need for additional monitoring beyond the second year will depend on an evaluation

of the survey results from the first two years to determine if the goals of the monitoring program have been met. If other publicly available data are available, they will be reviewed to support the discussion on additional monitoring. The need to extend the monitoring period will be determined by the BLM in consultation with the USFWS and CDFW. Implementation of any agency required pre-monitoring meetings, training, and searcher efficiency/carcass removal trials may delay the start of monitoring after the BBCS is deemed final. Upon agency approval of the BBCS, but no sooner than construction is completed on a whole phase, composed of at least 50% of the entire project solar array field, post-construction monitoring (as outlined in Section 5.2) will begin on all sampled units that have been turned over from construction management to operations management and are transmitting power to the grid. The 2-year minimum monitoring period for each phase will start when monitoring starts on all blocks in that phase.

2. Conduct statistically sound, seasonal assessments to quantify and evaluate carcass persistence rates (i.e., carcass removal, destruction including dismemberment, or burial in sand due to scavengers, decay, or other abiotic [e.g., wind] or human-related [e.g., vehicle activity] factors) and support calculation of adjusted fatality rates that account for variation in carcass persistence by season and carcass type/size classes. These assessments will also be used to guide search intervals.
3. Use current, scientifically validated and accepted methods for calculating fatality rates adjusted for searcher-efficiency, carcass removal rates, and spatial and temporal sampling intensity. At present, the best methods are distance sampling combined with searcher efficiency and carcass persistence bias adjustments and a fatality estimator, such as the Huso (2011) estimator, but it should be noted that fatality estimation is an area of active research and 'best methods' are changing rapidly. Therefore, as data are collected, the study design and monitoring protocol may be adapted to reflect knowledge gained while implementing the current design. Study design adaptations will follow the process outlined in Section 7.0 (Adaptive Management).
4. Summarize the species composition of fatalities according to taxonomic family, and ecological guild (e.g., raptors, water-associated birds, passerines, etc.) to aid in understanding species or species guilds at risk.
5. To the extent possible, summarize the composition of fatalities according to their likely propensity to collide with Project components during the day versus during the night based on known migratory patterns for the particular species.
6. Aid in identifying potential fatality causes and correlates by including additional information that is readily available beyond that which is under the SPUT Permit, such as the weight of fresh whole birds, or summaries of preceding weather conditions which would have made migration likely (e.g., low pressure systems moving cross-continent to the north of the Project area, followed by periods of high pressure systems).

5.2 Monitoring Methods

A monitoring program will be implemented for at least two years post-construction as specified below. Survey results and analysis will inform adaptive management decisions regarding any additional appropriate and practicable Bird and Bat Conservation Measures to avoid, minimize, and/or mitigate for observed impacts.

5.2.1 Post-Construction Monitoring of Solar Arrays

The fundamental characteristics of a sampling program designed to produce valid estimates of fatality rates for a PV solar facility (including the number of arrays to be searched, the search interval, the seasonal extent of coverage, and the number of years of sampling) are determined based on several factors. These factors include the questions of interest, the species of interest (e.g., resident, migratory, and/or wintering species) in the Project area, desired precision, best estimates of carcass-removal rates, searcher efficiency, the Project size and layout, and other relevant environmental (i.e., seasonal patterns), landscape, and habitat characteristics.

The following hierarchical terminology is useful for describing the spatial and temporal sampling design used to monitor solar panels:

1) Panel Cartridge: An engineered assembly of solar panels installed as a single unit.
2) Row: A collection of panel cartridges arrayed side-by-side on a common, linear support structure.
3) Array: A collection of approximately 25 rows of trackers that represent one-fourth of a typical block; dimensions are typically uniform within arrays, but may vary slightly among arrays. In most cases, arrays comprise structurally continuous rows surrounded by an unpaved road.
4) Block: Collections of commonly energized arrays each approximately 8,046 panels, separated in four quadrants. There will be a total of approximately 200 blocks.

5.2.2 Survey Strategy

Sampling strategies used in carcass searches have typically involved transect sampling, whereby searchers walk or drive along pre-defined transects and search for carcasses in a swath where width depends on visibility, target taxa, and other factors. The layout of PV facilities presents problems for a transect-sampling approach because rows of panels are close together (i.e., less than 5 m [16 ft] at the Project). Because the panels track the sun, a searcher walking or driving a transect between two rows can only effectively search one side of the transect (a 2.5-m [8.2-ft] swath) in the morning, and the other side is obscured by the edge of a PV cartridge; the other side of the transect would need to be searched in the evening when the panels were in a different position. However, traveling perpendicular to panel rows along the edges of the rows allows observers to see a greater distance of the ground beneath the panels. Surveyors will drive the lines in vehicles or walk,

depending on visibility conditions and the safety/logistics of driving within the array field. Survey methods (driving or walking) will be evaluated with the BLM and USFWS pending final facility design. Searcher efficiency trials will be conducted and monitored to identify potential issues with the survey method. Other accommodations may be required to enable completion of surveys during high temperatures, such as shifting surveys to dawn and dusk.

The layout of PV facilities is often well-suited to a distance-sampling approach. Distance sampling involves searching a transect line and assumes that searcher efficiency decreases (possibly dramatically) as a function of distance from the observer, and is ideally suited to situations in which animals (or carcasses) are sparsely distributed across a landscape (Buckland et al. 1993). If the landscape at the Project is flat and relatively clear of vegetation, a distance sampling design is well supported, as demonstrated at other PV solar facilities (WEST 2015, Huso et al. 2016b).

Distance sampling adjusts carcass counts for variable searcher efficiency by calculating the *effective* searcher efficiency along a transect. Effective searcher efficiency is the average probability of detection in the searched area, derived from the detection function. As a highly simplified example, if a searcher walks a 10-m (33-ft) long transect line and detects 90% of all carcasses within 10-m of the line, and 60% of carcasses that are 10 to 30 m (33 to 99 ft) from the line, then the effective searcher efficiency between zero and 10 m would be 0.9 and the effective searcher efficiency between 10 and 30m be 0.6. For the total 10 by 30-m area, the effective searcher efficiency would be

$$\frac{0.9 + 0.6}{100\,m^2 + 200\,m^2} = 0.5.$$

In practice, searcher efficiency is modeled as a continuous function of distance, and the detection function can be estimated from the carcass data or a bias trial. The searcher efficiency bias trials can be used to augment or replace carcass data for the detection function. An advantage to the use of data from bias trials is that the assumption that carcasses are randomly distributed within the search area (typical of most distance sampling designs) becomes unnecessary. An advantage to a data-driven detection function is that it is not necessary to specify a transect width: the detection function includes information about the distance at which searcher efficiency drops to near zero. The detection function is used to determine the overall probability of detection as well as to inform the approximate effective view shed of non-zero detection probability for observers.

5.2.3 Spatial Sampling Design

Under the proposed sampling plan, precision is expected to vary based on carcass detectability: less precision is expected for estimates of small-bird fatality compared to estimates of large-bird fatality. The sampling design is based on similar designs utilized at DSL, Blythe (WEST 2016b), and McCoy (WEST 2016c) solar projects, and is consistent with guidance provided in Huso et. al (2016). The monitoring plan will encompass approximately 40% of the completed solar arrays as summarized in Table 9.

Table 9. Solar array sampling area characteristics.

Total fenced area	1,700 ha
Solar field	1,659 ha (approximately 200 2.5-MW blocks)
Proportion sampled	40% ± 2%
Sampling unit	~8.3-ha, spatial equivalent of 1 block
Number of sampling units	Approximately 80
Migration season search interval (March 1 thru May 31, September 1 thru October 31)	7 days unless adjusted by BLM and wildlife agencies based on results carcass persistence trials
Non-migration season search interval (June 1 thru August 31, November 1 through Feb 28/29)	21 days unless adjusted by BLM and wildlife agencies based on results of carcass persistence trials
Anticipated surveys per year	Approximately 31 surveys
Duration of sampling	Minimum 2 years

Because both the presumed layout of the solar arrays and the landscape of the Project (i.e., mostly flat and free of vegetation) are largely uniform, a relatively simple random sampling design is likely to be adequate for sampling the arrays. However, in the absence of data, a spatially balanced sampling design will be used. Samples will be selected in a stratified random design to ensure a spatially balanced sampling design and an approximately 40% sample of each type of array. Because spatially balanced designs ensure that sample effort is distributed over the whole study area, they help to ensure that spatially organized trends in mortality (should they exist) can be extracted from the data. The drivers of spatial variation in avian activity may be important to the statistical sampling design if avian use patterns affect the distribution of mortalities on the Project site. As an example, factors that may affect avian use patterns include: 1) habitat variation around the Project site; 2) the possibility that distinct movement corridors variably concentrate birds over certain areas of the Project site (e.g., migrating or commuting water-associated birds); or 3) use of distribution lines (and other gen-tie line infrastructure) as roosting sites. Distribution lines within the solar field may also pose a collision risk to birds. To achieve spatially balanced sampling, the site will be divided into seven approximately equal-sized sampling areas and sampling will be stratified among those areas.

The sampling units for the surveys consist of areas equivalent in size to four sub-arrays. Within sampling areas, individual sampling units will be randomly selected to compose a 40% sample (± 2%). Sampling units will be surveyed from the outer edges of sub-arrays (collections of continuous solar panel rows) and scan between each row for fatalities, with each side-specific survey covering at least half the width of the sampling unit, depending on the length of the row. Observers will drive along east-west roads that bisect sampling units and scan left (out of the driver's window), and then turn around at either an inverter or main road where space allows. The observer will look left on the return trip, searching the opposite side of the unit. However, alternatively, to potentially reduce the risk of vehicle incidents, the observer may survey the unit from the south looking north, and then drive to the north side of the unit and survey looking south. Most sampling units are planned to consist of four sub-arrays, each forming a structurally continuous unit composed of

approximately 25 panel rows of panel strings. In these cases, two east-west routes will comprise the sampling-unit survey, with each route involving scanning across the entire length of a single subarray row (Figure 12). Distance sampling and resulting data will be used to calculate detectability curves to calculate the average detection probabilities, and taking into account the potential for different detection curves depending on the direction of the survey view shed.

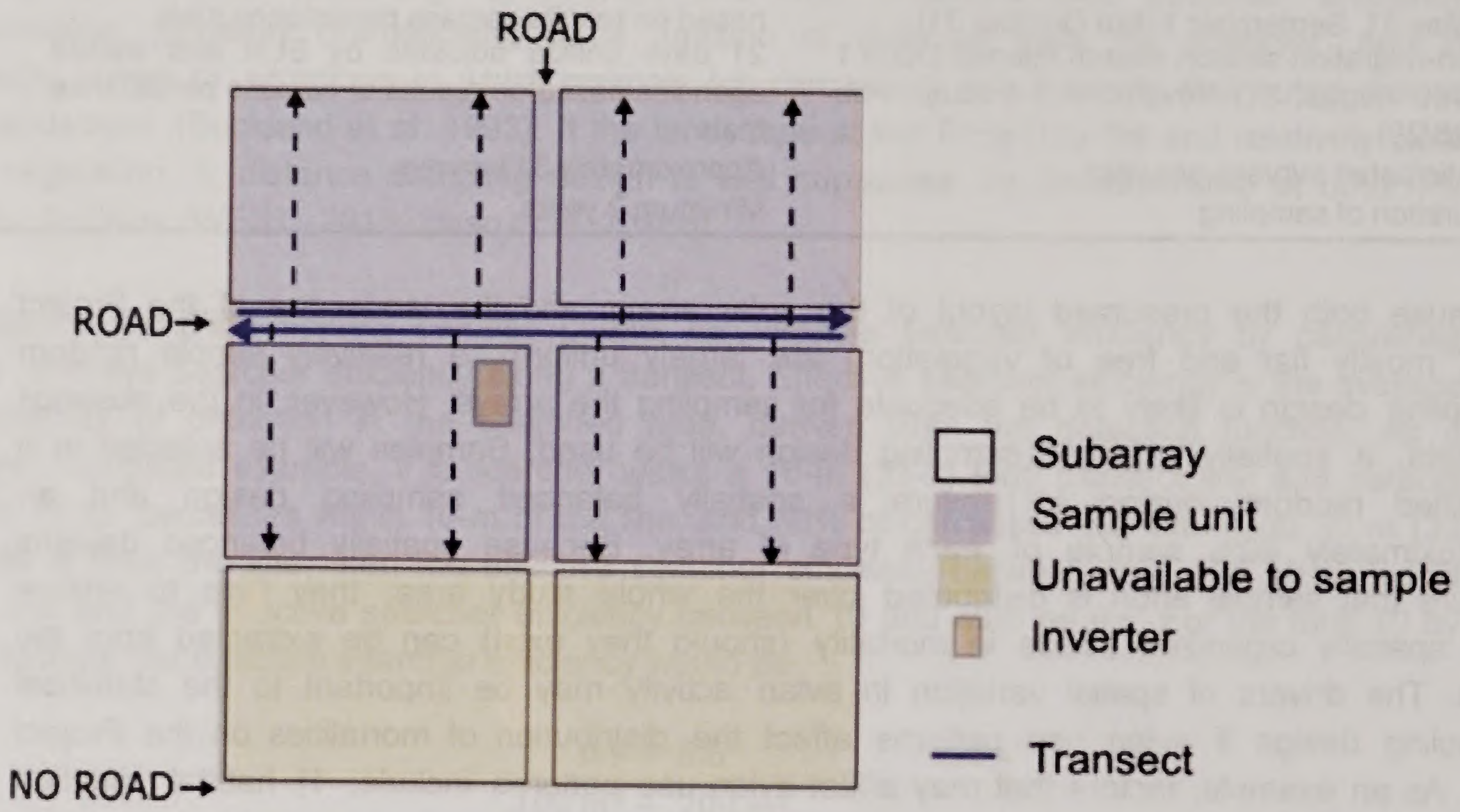

Figure 12. Example illustration of generic photovoltaic sampling unit and perimeter survey with travel routes and search areas ("observation perspectives").

This survey design reflects two concerns:

1. Minimizing movement between rows of solar panels. Because the area between electrified panel rows is an area of elevated risk, best practices dictate that personnel do not enter elevated risk zones unnecessarily; and
2. Achieving an effective balance between logistic efficiency and sampling rigor given the constraints of transect spacing due to the width of panel rows.

Not being able to detect most small-sized to many medium-sized carcasses over a substantial portion of the solar facility would comprise a problematic bias if the probability of carcass occurrence was non-random within arrays (i.e., within sample units). In other words, the bias would create a problem for achieving representative sampling if the probability of mortality due to panel collisions varied in some predictable fashion relative to

the distance from array edges, or if there was a tendency for fatalities to be clustered in the interior of the panel areas.

On this basis, fatality sampling will proceed using distance-sampling survey techniques and analytical methods, which include estimating and accounting for distance-related variation in the probability of detection based on the carcass data and bias trial data. In addition, searcher- efficiency trials that are tailored to include evaluating the influence of distance on the probability of detection will be conducted to ensure that searcher efficiency can be calculated.

5.2.4 Temporal Sampling Design

The appropriate frequency of fatality surveys depends on the species of interest and average carcass persistence times (Smallwood 2007, Strickland et al. 2011, USFWS 2012). Large birds, and to a greater extent raptors, tend to persist and remain detectable for extended periods (weeks to months) due to low scavenging rates and relatively slow decay rates. If only large species were of interest, extended search intervals of 20-40 days might be appropriate; however, some small and medium-to-large sized birds may disappear at faster rates, so shorter search intervals are required to ensure effective documentation of fatality rates among these species.

Publicly available data from three wind energy studies in the nearby Mojave Desert region of California and western Arizona provide additional, relevant insight (Chatfield et al. 2009, 2010; Thompson and Bay 2012). These studies recorded average persistence times of 17.5-46.8 days for large birds (average 29.0 days, median 22.6 days) and from 5.6-17.4 days (average 9.9 days, median 6.5 days) for small birds. If the median carcass-persistence time for small- and medium-sized birds and bats on the Project site is low, a 7-day search interval may be required to effectively document fatality rates for small birds and bats. If, however, median small-sized bird and bat carcass persistence rates are greater than seven days, then a longer search interval may be more appropriate.

Based on these considerations and preliminary data, and based on the simulation analyses discussed previously, the search interval for fatality monitoring will be variable depending on season. Searches will be conducted every seven days during standard spring and fall migration periods (March 1 – May 31, and September 1 – October 31, respectively), and every 21 days during summer and winter (June 1 – August 31, and November 1 – February 28/29, respectively). After the first six months of fatality monitoring and concurrent carcass removal trials (see below) have been conducted, the search interval may be adjusted based on estimates of carcass persistence. Some migration for some species may occur outside these periods and this will be considered when evaluating the data regarding timing of mortality for species found as fatalities.

Adjusting fatality counts for carcass removal works best when the search interval remains constant through time (Huso 2011); however, within survey periods, season-specific

estimates of carcass persistence can be calculated and incorporated in the overall estimation process when variable search intervals are used in different seasons (Shoenfeld 2004, Huso 2011). In addition, survey schedules will ensure that fatality surveys are evenly spaced in time to maximize detection of potential, unusual fatality events (Strickland et al. 2011). For these reasons, a standard schedule for completing the surveys has been developed, such that some surveys will occur during most weeks of the year and all sampling units are surveyed on a regular schedule, as dictated by the season.

Survey blocks will be added as phases of the Project become operational over the first year of monitoring. Specifically, blocks will be added in parallel with each phase being turned over to operations management, beginning with the first phase or phases covering at least 50% of the entire project solar array field. Monitoring at each sampled block in a phase will begin at the start of the season (as defined above) immediately following turnover to operations, to ensure monitoring effort is consistent within a season.

5.2.5 Survey and Data Collection Protocols

Fatality surveys will be conducted with the observers striving for a consistent pace/speed and approach, and a uniform search effort throughout the search. Searchers will use binoculars at their discretion to survey for carcasses between each row of panels. The Project has rigorous safety protocols in place that address heat and other safety issues. When a potential carcass is detected, the observer will immediately proceed down the row to confirm the detection and, if valid, fully document and bag it according to standard protocols (see below). Depending on the size and nature of the carcass, the observer will either immediately collect the carcass (smaller, easily collected and transported packages) or flag it for pick-up once the sampling-unit survey is completed (larger, messier, or otherwise complicated collections) or to identify it to species. All carcasses will be stored in freezers on-site until the BLM and USFWS determine the ultimate disposition.

All bird and bat injuries and fatalities discovered during, or incidental to, the standard carcass surveys will be documented according to the requirements and standards reflected in the USFWS Avian Injury and Mortality Reporting Form. The form is a reporting requirement of the USFWS Special Purpose – Utility (SPUT) Permit issued to the Project to authorize the handling of dead or injured birds. In addition, finds will be classified as a fatality according to standards commonly applied in California (Altamont Pass Avian Monitoring Team 2007, CEC and CDFG 2007). For detections that only include feathers, to be classified as a fatality, each find must include a feather spot of at least five tail feathers or two primary flight feathers within five m or less of each other, or a total of 10 feathers concentrated together in an area of three square m (1 m^2; 32 square ft [ft2]). Feathers with tissue still attached are considered a carcass detection, not a feather spot. Searchers will make their best attempt to classify feather spots by bird size according to the sizes or identifying features of the feathers. A separate fatality estimate will be made for feather spots for which size classification is impossible. Digital photographs will be taken to document all incidents in situ with a minimum 12-megapixel camera, showing the dorsal, ventral, and head area. When possible, plausible cause of death will be indicated on data sheets based on evidence

(such as blood or fecal smears on solar panels, burns that may indicate electrocution, or blunt trauma that may indicate collisions). All carcasses will be examined and, where possible, cause of death will be recorded with some measure of certainty (e.g. observed, probable, possible, unknown, etc.). An avian biologist will make decisions on likely cause of death and this will be reviewed by the lead biologist overseeing the program. If a clear cause of death is not apparent, this will also be noted.

All fatalities will be assigned to a size class, a taxonomic family, and an ecological guild and weight categories (e.g., 0-100 grams; 101-999 grams; and 1,000+ grams). Species will also be classified as resident, overwintering, or whether they are diurnal or nocturnal migrants (or both). It is necessary to know size classes to appropriately correct for searcher efficiency and scavenging, and data about taxonomic family, ecological guild, and time of day when the species are typically active are relevant to the specific USFWS and Project goals of the post- construction monitoring plan (Plan).

To ensure accurate documentation of the fatality locations, the observer will record the array number, GPS coordinates in latitude/longitude of the carcass location using a handheld device accurate to ± 3.0 to 4.0 m (9.8 to 13.1 ft), and a measurement of the distance from the fatality location to the end of the panel row from which the carcass was detected. When an observer proceeds down panel rows to confirm and document detected fatalities, they may detect other fatalities that they did not observe based on the perimeter-only survey. Including such detections in the fatality estimate will bias estimation of fatality density based on application of standard distance-sampling analytical methodology. Therefore, all such supplementary detections will be classified as "incidental" finds (discussed further below). Carcasses that are found within standardized search areas but incidental to the distance sampling searches can be used as an additional validation of the detection functions; the detection function specifies the distribution of found carcasses, but it also specifies the distribution of missed carcasses, and incidentals should follow the latter distribution.

Data records for each survey will also include: 1) full first and last names of all relevant surveyors in case of future questions; 2) start and stop times for each individual sampling-unit survey; 3) a standardized description of the current habitat and visibility classes represented within each sampling unit; and 4) a description of any search-area access issues, if relevant. Data collected will also include all appropriate fields contained in the SPUT Permit.

Surveyors will record data for each detection on a standardized form. To conform to requirements from wildlife agencies, data collection will include:

- Surveyor name
- Discovery date and time
- A unique identification code

- Species
- Sex and age (if determined)
- Cause of death or injury (if determined)
- GPS waypoint of find (WGS84 datum)
- Nearest project component (PV array, power line, power line structure, building, fence, pond, materials storage, vehicle /equipment, other)
- Distance to nearest project component
- Distance to nearest PV panel
- Identifiers for photographs taken in situ (close and wide)
- Observed weather (% cloud, temperature, wind)
- precipitation within previous 24 hours
- Sustained high winds during previous 24 hours
- Condition of specimen
    - alive, no sign of physical trauma
    - dead and intact
    - dismembered
    - feather spot*
    - injured but alive
- Disposition of live bird
    - released
    - sent to rehab
- Time since death
    - < 1 day (no rigor mortis)
    - 1 day (rigor mortis, no odor)
    - 2-3 days (odor present, eyes dried /missing)
    - 3-5 days (strong odor, decomposing)
    - Unknown (feather pile*/other)
    - N/A (animal still alive)
- Evidence of scavenging (Y/N)
- Additional relevant comments to support the recorded information.

*A feather spot consists of at least five tail feathers or two primary flight feathers within five meters (16.4 ft) or less of each other, or a total of 10 feathers of any type (i.e., including body feathers).

All personnel involved in implementing this Plan will be included as sub-permittees under the Project's USFWS SPUT Permit, issued either to the Project or a consultant authorized by the Project. If the CDFW does not consider coverage under the USFWS SPUT Permit sufficient, all personnel implementing this Plan will also be covered under any applicable CDFW Scientific Collecting Permit, if provided, and issued either to the Project or its consultant. Ideally, the relevant state and federal permits will allow fatalities discovered during the study to be removed from the field, stored on-site in a freezer, and used in searcher-efficiency and carcass-removal bias trials. Necessary exceptions will apply to all special-status species (see below). Otherwise, surveyors will place all discovered carcasses or body parts that are not of a special-status species and are not part of an ongoing bias trial in plastic zipper storage bags, clearly label each bag with the incident number, and deliver the bags for storage in the designated freezer at the Project facility.

5.2.6 Fence Line Monitoring

The inside of the perimeter fence is subject to inspections approximately once every seven days during spring and fall migration, and approximately once every 21 days during winter and summer periods with intervals adjusted as necessary based on carcass persistence trials. A searcher will drive areas accessible by vehicle close to the inner perimeter of the fence, scanning for fatalities within an approximate 6- to 10-m (20- to 33-ft) strip transect centered on the fence. There may be some environmentally sensitive areas along the fence with access restrictions. These areas will not be sampled as long as the restrictions are in place. Travel speed will be no greater than five mph (eight kph) while searching to ensure quality detection and safety. Personnel conducting fence checks will document bird and bat injuries and fatalities discovered along the inner fence line. Injuries and fatalities along the fence line will be documented in the same manner as used for those discovered during the array carcass surveys, and will be reported to the USFWS and CDFW as part of the same overall reporting process. Searcher efficiency trials will be conducted along the inside of the fence. Carcass removal trials conducted at solar arrays will include areas near the inside of the fence as well.

5.2.7 Gen-tie Line Monitoring

The gen-tie line will be built to APLIC Guidelines (2005, 2006, 2012); however, there is still a collision risk for birds. The 11-km (7-mile) gen-tie line will be broken up into 500-m (1,640-ft) segments, and every other segment will be sampled. Some segments may be eliminated from consideration for sampling if they cannot be easily reached by a vehicle (e.g., too sandy). If a segment that was selected is inaccessible, a new unit will be selected to be sampled in its place. A 50% sample of the gen-tie line will be monitored every seven days during spring and fall migration, and approximately every 21 days during summer and winter, with intervals adjusted as necessary based on the carcass persistence

trials. Searchers will drive or walk 50% of the gen-tie line during each visit, scanning for birds within 15 m (about 50 ft) from the line. Injuries and fatalities along the gen-tie line will be documented in the same manner as used for those discovered during the array carcass surveys, and will be reported to the USFWS and CDFW as part of the same overall reporting process.

Some overhead electrical feeder and distribution power lines are co-located within the solar arrays and these co-located power lines may be searched as part of the regular monitoring schedule at arrays. Fatalities that are determined to have been caused by the power lines (as determined by the nature of injuries) will be reported as such to the USFWS and CDFW as part of the same overall reporting process and included in overall fatality estimates.

5.2.8 Clearance Surveys

A one-time clearance survey will be conducted within two weeks of the date on which a sampled phase (or the entire facility) is considered completed, energized, and turned over to operations. The purpose of this survey will be to clear the survey area of any accumulated carcasses that may be present. The sequence of clearance surveys will mirror the schedule for the first official survey to ensure that the interval between the clearance survey and the first standard survey is the same for all sampling units. This is necessary to ensure that carcasses detected during the first round of surveys represent only fatalities that occurred during a preceding interval equivalent to the search interval that will apply afterward. Carcasses that are missed during the clearance survey may cause an upward (conservative) bias in the fatality estimate. Additionally, some estimators (such as the Huso estimator described above) become biased if carcasses that are not detected during a trial are still available during subsequent trials. This “bleed through” effect can be ameliorated by including only fresh carcasses in the fatality estimate, where “fresh” means a carcass that has arrived since the previous search. Carcasses that cannot reliably be aged (potentially many carcasses and most feather spots) will be assumed to have occurred within the search interval, resulting in an upward (conservative) bias in the fatality estimate.

5.3 Bird Rescue

Searchers will record any injured or rescued birds or bats located during surveys. Birds will be assessed by a qualified biologist to determine if it is appropriate to transport the individual to the nearest CDFW permitted rehabilitation facility for proper care, or to release them. Injured raptors will be handled only by experienced personnel and will be taken only to rehabilitation facilities that are permitted to handle raptors; this provision is particularly important for eagles. From the Project site, the closest rehabilitation facilities capable of handling all avian species are:

- Coachella Valley Wild Bird Center, 46500 Van Buren, Indio, California, 92201; Phone: 760-347-2647; Contact: Linda York, Executive Director; Hours of Operation: 9:00 am -1 2:00 pm, seven days a week. http://coachellavalleywildbirdcenter.org/

- The Living Desert Zoo & Gardens, 47900 Portola Avenue, Palm Desert, California, 92260; Phone: 760-346-5694 x8 x1; Contact: Sheila Lindquist, North American Manager; Hours of operation: 8:00 am - 1:30 pm (June-September), 9:00 am - 5:00 pm (October-May), seven days a week (closed Christmas Day). http://www.livingdesert.org/animals/wildlife-rehabilitation/
- Hope Wildlife Rescue, 18950 Consul Avenue, Corona, California 92881; Phone: 951- 279-3232; Contact: Bill Anderson or Cyndi Floreno.
- All God's Creatures Wildlife Rescue & Rehabilitation, Chino Hills, California, Phone: 909- 393-1590; Contact: Lori Bayour; http://www.allgodscreatures.net/index.html; no address available, contact by phone.
- International Bird Rescue, Los Angeles Center, San Pedro, California, 90731; Phone: 310-514-2573; Hours: 8:00 am - 5:00 pm. International Bird Rescue specializes in waterbird rescue.
- A list of wildlife rehabilitators maintained by the CDFW: http://www.dfg.ca.gov/wildlife/WIL/rehab/facilities.html
- The California Council for Wildlife Rehabilitators: http://www.ccwr.org/resources/rehabilitation-facilities-region-6.html

If stranded, but apparently uninjured, water-associated birds are discovered at any time during surveys, the searcher will take immediate steps to notify an on-call biologist, and assist with efforts to secure the bird and have it transferred as expediently as possible to Lake Tamarisk for release into the water. If a qualified biologist is not available, all stranded birds (injured or apparently uninjured) should be immediately taken to a rehabilitator for evaluation. Injured or exhausted water-associated birds should be taken to International Bird Rescue, which specializes in the care and rehabilitation of water-associated birds. If a mass event involving many such birds is observed, the searcher, if not an approved biologist, will immediately notify the on-call biologist or other biological personnel working on the site and request their assistance identifying injured versus non-injured birds and transporting injured birds to the nearest rehabilitation facility. International Bird Rescue can also assist with mass stranding events. Rehabilitation facilities would be compensated by Palen Solar III for the costs associated with each bird put under their care.

If a searcher discovers a dead individual of a species that is fully protected by the state or federally or state-listed as threatened or endangered, and for which handling is not specifically authorized under the applicable salvage permits, he/she will collect data and photos as for any other fatality, but then flag the carcass to mark its location, cover it with a bucket or another way to secure its location, and leave it in place. If it has been confirmed as a federally listed species under the ESA, the searcher will immediately call a USFWS Office of Law Enforcement special agent to determine the appropriate follow-up action.

5.4 Searcher Efficiency Trials

Estimating searcher-efficiency (distance-related detection functions) is a standard component of the distance-sampling approach. Moreover, because estimating detection functions is applied to all survey data and can be organized to variably adjust in relation to covariates of interest (e.g., season, habitat, and carcass size classes), application of this approach will account for typical factors of interest for fatality studies (CEC and CDFG 2007, Huso 2011, Korner-Nievergelt et al. 2011, USFWS 2012, Smallwood 2013). In this case, independent searcher-efficiency trials per season will be conducted to help assess and adjust for potential spatial bias in the distribution of fatalities among arrays. Separate trials will be conducted to assess detection probability associated with fence and gen-tie searches.

The desert landscape in which this Project is located generally changes little with the seasons, save for brief periods following winter and spring rains when floods may occur and blooming plants may flourish. A recent meta-analysis involving data from more than 70 wind-energy projects suggested that including habitat visibility class as a predictive variable generally eliminated any otherwise apparent seasonal effects on searcher efficiency (Smallwood 2013).

Nevertheless, the supplementary searcher efficiency trials for this Project will be repeated seasonally (winter, spring, summer, and fall) and trials will be organized so that all search personnel participate in bias trials. Placement of trial specimens will be timed to limit the number of trial carcasses placed on the landscape at any one time (minimizing the chance of artificially attracting scavengers or, conversely, scavenger swamping; Smallwood 2007). This approach will also ensure that any new surveyors that join the crew participate in searcher efficiency trials. The trials will also be managed to ensure effective quantification of searcher efficiency in relation to predefined habitat visibility classes (low, medium, and high, if relevant), size classes of birds (small, medium, and large), and detection distance.

The bias-trial sample sizes required to produce precise, adjusted fatality estimates are not well established, in part because needs may vary substantially depending on actual project-specific searcher efficiency, carcass removal, and fatality rates. However, using searcher-efficiency trials to help evaluate the efficacy of perimeter-only surveys and the distance-sampling approach used in this investigation will require larger sample sizes to produce a sampling design that effectively accounts for distance as a key covariate of interest. In addition, if growth of new ruderal vegetation, or substrate heterogeneity caused by flood events, is sufficient to create a new visibility class under the arrays, the specimen numbers would need to increase to effectively account for this factor. It will also be necessary to ensure that the estimates of searcher efficiency encompass variation among multiple surveyors. The influence of individual surveyors will not be accounted for in a formal, statistical sense by including "surveyor" as a covariate in the estimation model; however, all surveyors will be tested similarly. Each surveyor will be exposed to multiple test specimens of each size class, and at similar repeated levels if testing in different habitat visibility

classes is required. A minimum of 25 carcass samples per small size class, 15 for medium, and 10 for large is anticipated within the solar array per season, while 15 small, 10 medium, and 10 large carcasses are anticipated along the fence line and gen-tie line sampling areas, per season. Searcher efficiency will be summarized for each individual searcher, but to avoid needlessly inflating the variance of the estimate, individual searcher effects will not be included in the fatality estimation model.

Besides representing birds of different sizes, another important factor to consider in searcher- efficiency and carcass-removal trials is the bird species to use as trial specimens. Ideally, all carcasses used for both searcher-efficiency and carcass-removal trials should reflect the range of species likely to be encountered as fatalities in the Project area (CEC and CDFG 2007). Because obtaining sufficient samples of "natural" carcasses often is difficult, researchers frequently resort to using readily available, non-native surrogate species in bias trials; however, this practice may result in biased results when compared to studies that use only "natural" specimens (Smallwood 2007). For all bias trials, this program will maximize use of representative native or naturalized species authorized by permits, either found during the study or gathered elsewhere, as needed, and from diverse sources where possible, but all trial carcasses will be obtained and deployed in a manner that are consistent with applicable regulatory requirements.

Another factor that influences carcass detectability is how fresh and intact the carcass is (Smallwood 2007, 2013). If multiple pieces of a depredated or scavenged carcass are scattered over a modest area, in some cases the fatality may be more easily detected; however, detectability generally decreases when only remnants of a carcass are present, or when the carcass is aged and degraded. Nevertheless, in contrast to wind energy projects, there is little expectation that this Project will cause injuries and fatalities that result in dismembered carcasses, so this factor is not expected to influence searcher efficiency bias or carcass removal rates (Smallwood 2013). Therefore, bias trials conducted in this study will involve primarily intact carcasses. The searcher-efficiency trial specimens may range from freshly thawed to partially decayed (i.e., selected, subject to availability, to mimic the range of carcass decay that typically accrues over 7-day periods).

A field supervisor or other technician not involved in the standard surveys will place the trial specimens and will recover any specimens missed by the surveyors. All trial specimens will be placed according to a sampling plan that randomly allocates carcasses of different sizes among survey plots and survey days within the assessment areas, but is stratified to ensure equitable representation of different surveyors, and fence line versus solar arrays versus gen-tie versus seasons. To minimize the possibility of unnecessarily attracting scavengers or, conversely, contributing to scavenger swamping, which could affect ongoing carcass-removal trials (Smallwood 2007, Smallwood et al. 2010), placement of searcher-efficiency trial specimens will be distributed throughout the year (appropriately organized to provide season-specific estimates with adequate samples to provide a robust estimate of searcher efficiency), with few specimens placed at any one time. Carcasses will be placed carefully to minimize disturbance of substrates that may bias carcass detection.

Sample size and frequency of trials in the second year may be changed (i.e., reduced or increased) if warranted by results of the first year of monitoring and approved by overseeing agencies.

All trial specimens will be inconspicuously marked with a piece of black electrical tape wrapped around one leg, in a manner that allows the surveyor to readily distinguish trial specimens from new fatalities, but without rendering the specimen unnaturally conspicuous (Smallwood 2007, USFWS 2012). To ensure a degree of "natural" placement, carcasses need to be represented by placing them between rows of panels, under panels, near I-beams supporting the panels, or in the open. Therefore, carcasses will be tossed towards the designated, randomly chosen placement spot from a distance of three to six m (10 to 20 ft). Documentation of each location will include GPS coordinates, notes about the substrate and carcass placement, and a digital photo of the placement location.

Surveyors will have only one opportunity to discover placed specimens. Any missed specimens will be recovered as quickly as possible after surveys have been completed in a given area, and after the surveyor(s) have become aware of the trial through discovery of one or more specimens. Some researchers have argued for leaving missed specimens in place to enable possible discovery in a subsequent survey and thereby mimic the natural situation in which "bleed-through" is possible (e.g., Smallwood 2013, Warren-Hicks et al. 2013; discussed further below). Although this approach may have merit in some situations, its potential value for this Project is offset by the need to avoid attracting ravens because they may prey on desert tortoises in the area (Tetra Tech 2014).

5.5 Carcass Persistence Trials

The degree to which carcasses persist on the landscape depends on a variety of factors reflecting seasonal variation in landscape/climatic conditions and the scavenger community. The composition and activity patterns of the scavenger community often vary seasonally as birds migrate, new juvenile birds and mammals join the local population, and mammalian scavengers variably hibernate or estivate. Seasonally variable climatic conditions also may contribute to variation in carcass decay and removal rates due to variation in temperatures, solar insolation, wind patterns, and the frequency of flooding events. Therefore, to ensure accurate treatment of this bias factor, carcass-persistence rates will be assessed on a semi-annual basis during the first year that fatality surveys are conducted (CEC and CDFG 2007, USFWS 2012, Smallwood 2013), and during the second year as needed. It is also imperative that carcass-persistence trials effectively account for the influence of carcass type/size, given that persistence times may vary widely depending on the species and size class involved (Smallwood 2013).

To quantify carcass persistence, target sample sizes of 30 small, 20 medium, and 10 large carcasses will be randomly placed and monitored within the solar arrays (including the fence line), and 25 small, 15 medium, and 10 large along 50% of the gen-tie line each season. A minimum of 15% of the carcasses in the solar arrays will be monitored, using motion-triggered, digital trail cameras (e.g., see Smallwood et al. 2010) while the remaining

will be visited on foot; carcasses will be monitored for 30 days or until the carcass has deteriorated to a point where it would no longer qualify as a documentable fatality. For carcasses not set up with cameras, the carcass will be visited once a day for the first four days, and then every three to five days until the end of the 30-day trial is reached. Fake cameras, cameras without bias trial carcasses, or decoy carcasses will also be placed to avoid training ravens and other scavengers to recognize cameras as "feeding stations". Periodic ground-based checking of carcasses also will occur to guard against misleading indicators of carcass removal, such as wind blowing the carcass out of the camera's field of view. To minimize potential bias caused by scavenger swamping (Smallwood 2007, Smallwood et al. 2010), carcass-persistence specimens will be distributed across the entire Project, not just in areas subject to standard surveys, and small numbers of new specimens will be placed every two to three weeks.

Trial specimens will include only intact, fresh (i.e., estimated to be no more than one or two days old and not noticeably desiccated) bird carcasses that are either discovered during the study or are acquired from other sources after having been frozen immediately following death. If permits allow, preference will be to use carcasses of species that occur in the area. Surrogates (such as upland game birds and waterfowl), that are similar in size and appearance to native species that occur in the area, will be obtained from commercial sources and used if necessary to meet the required sample sizes. However, domestic waterfowl or upland game birds that are white or brightly colored (e.g., male ring-necked pheasants [*Phasianus colchicus*]) will not be used. Scavenging rates for some surrogates (e.g., medium- to large-sized game birds that are used to represent raptors) may be artificially high (Smallwood 2007, 2013) and may lead to conservative fatality estimates (i.e., an overestimate) for some taxa/bird types.

To reduce possible biases related to leaving scent traces or visual cues that may unnecessarily alert potential scavengers, all carcasses used in carcass-persistence trials will be handled with latex gloves, and handling time will be minimized. All trial specimens will be inconspicuously marked with fingernail polish on the bill and legs to distinguish them from both unmarked fatalities and searcher efficiency trial specimens.

Upon conclusion of the relevant monitoring period, each trial specimen will be classified into one of the following categories:

- **Intact**: Whole and un-scavenged other than by insects;
- **Scavenged/depredated**: Carcass present but incomplete, dismembered, or flesh removed;
- **Feather spot**: Carcass scavenged and removed, but sufficient feathers remain to qualify as a fatality, as defined above; or
- **Removed**: Not enough remains to be considered a fatality during standard surveys, as defined above.

5.6 Estimating Adjusted Fatality Rates

The sampling design will enable calculation of fatality estimates adjusted for searcher-efficiency, carcass-removal rates, and proportion of area sampled. The adjustment for searcher efficiency will occur by virtue of applying standard methods for analyzing detection data collected using distance-sampling methods, with the data partitioned by season and standardized carcass size classes. The fatality estimates will be adjusted for variation in carcass persistence, by applying seasonal and carcass-size-specific correction factors to the fatality estimates that have been adjusted for distance-related variation in the probability of detection.

The analytical approach used to calculate adjusted fatality estimates will be similar to that applied in cases where the fatality estimates are derived from strip transects. For illustrative purposes, we summarize here the basic formulation of the Huso estimator (Huso 2011), the first part of which pertains to fatality estimation for different strata, or groups. Essentially, the smallest group for which fatalities are estimated can be considered a stratum, with stratum *k* representing, for example, a set of similarly sized birds within a defined habitat visibility class. Note that strata should be defined to ensure minimum variance in detection probabilities within individual strata, whereas probabilities may vary considerably among strata (e.g., for small versus large birds, or in habitats of low versus high visibility). Depending on the circumstances, there can be strata based on species groups, size classes, seasons, habitats, and/or infrastructure types (also could conceivably model distance categories as another covariate).

For a particular stratum *k* for a given survey plot and search interval, fatality can be estimated as:

$$\hat{F}_k = \frac{c_k}{\hat{\pi}_k}$$

where c_k is the number of observed carcasses and g_k is the probability of detecting a carcass. The detection probability *g* typically is the product of three variables: the probability of a carcass persisting (*r*), the probability of a carcass being observed given that it persists (*p*), and the effective proportion of the interval sampled (*v*):

$$\widehat{\pi_k} = \widehat{p_k} \cdot \widehat{r_k} \cdot \hat{v}_k$$

5.6.1 Estimation of Searcher Efficiency Rates

Searcher efficiency rates, $\hat{p}$, are estimated for each size class using a logistic regression model. Additional covariates for this logistic regression model may include season, ground visibility, and the interactions between these variables. The logistic regression models the natural logarithm of the odds of finding an available carcass as a function of the above covariates. The model assumes that searchers have a single opportunity to discover a

carcass. The best model is selected using an information theoretic approach known as AICc, or corrected Akaike Information Criteria (Burnham and Anderson 2002).

5.6.2 Estimation of Carcass Persistence Rates

Estimates of carcass persistence rates are used to adjust carcass counts for removal bias. Carcass persistence is modeled as a function of carcass size, and possibly other variables including plot type, season, ground visibility, and the interactions between these variables. The average probability of persistence of a carcass, $\hat{r}$, is estimated from an interval censored survival regression model. Exponential, log-logistic, lognormal, and Weibull distributions are fit and the best model is selected with AICc.

5.6.3 Carcasses Excluded from Fatality Estimation

One of the underlying assumptions of the Huso model is that searchers have a single opportunity to discover a carcass (Huso et al. 2016a). In practice, particularly when carcass persistence times are long, carcasses may be discovered that have been available for more than one search. In order to meet the assumptions of the Huso model, the estimated time since death is determined for each carcass, in the field. A carcass is excluded from fatality estimation if the estimated time since death is longer than the search interval associated with that carcass; in other words, a carcass with estimated time since death longer than the search interval is assumed to have been available for more than one search.

5.6.4 Adjusted Facility-Related Fatality Rates

The estimated probability that a carcass in category *k* was available and detected is:

$$\widehat{\pi_k} = \widehat{p_k} \cdot \widehat{r_k} \cdot \widehat{v_k}$$

where $\widehat{v_k} = \min(1, \tilde{I}_k/I_k)$. The model assumes that searchers have a single opportunity to find each carcass, even though some carcasses may persist through multiple searches before being detected. Therefore, a carcass is included in adjusted fatality estimates if it has been available since the last search, and no longer. The probable time since death, recorded in the field, is used to evaluate each carcass for inclusion in the final fatality estimates.

The total number of fatalities ($\widehat{f_k}$) in category *k,* based on the number of carcasses found in category *k* is given by:

$$\widehat{f_k} = \frac{c_k}{\widehat{\pi_k}}.$$

Adjusted fatality estimates for the Project may be expressed per unit area (e.g., acres or arrays) per year, or overall (extrapolated from the sample units) per year.

5.7 Incidental Fatality Documentation

Once post-construction fatality monitoring begins, all subsequent bird and bat injuries and fatalities detected incidentally to the standardized post-construction monitoring program will be classified as "incidental finds," documented using similar procedures as are used for specimens discovered during the standardized surveys (see section 5.2.5), and integrated with records from the standardized surveys for summary reporting and evaluation purposes. Incidental finds that occur outside of standard search areas will not be included in calculations of adjusted post-construction fatality estimates, but will be summarized within semi-annual reports (discussed below).

From a statistical standpoint, a bias will occur if carcasses that are found in standard search areas, but not during standardized surveys, are recorded and removed prior to the next search of that array. Per USFWS direction, and to be consistent with the Raven Monitoring, Management, and Control Plan, these carcasses will be reported directly to an authorized biologist. These incidental finds will be documented using the same procedures as those discovered during standardized surveys. Data from incidental finds within standardized search areas will be included in analyses, when otherwise appropriate, to estimate mortality as a conservative approach. Appropriate caveats can be included within the semi-annual reports to document the potential magnitude of any biases created by including these carcasses in fatality estimates.

5.8 Minimum Credentials of Monitoring Personnel and Training

The fatality monitoring program will be overseen by an Avian Biologist, approved by the BLM in consultation with wildlife agencies, who has demonstrated the ability to accurately identify the pecies of birds and bats potentially impacted by the Project. Additional biologists will be approved by the BLM in consultation with the wildlife agencies for the purpose of accurately identifying species of birds and bats potentially impacted by the Project. The approved biologists will assist with fatality monitoring and will be available to respond to incidents at the Project that require expert assistance (e.g., uncertain species identification, possible listed species, or injuries) within 24 hours. In addition, a biologist (with a minimum of a Bachelor's of Science in wildlife sciences) will be on-site during days of standardized monitoring.

Monitoring personnel may include solar facility staff, if approved by agencies after being evaluated for effectiveness prior to monitoring. Monitors will be trained in distance-sampling search methodology, correct identification and documentation of carcasses, implementation of carcass removal trials, and notification of a rehabilitation center in the event of injured birds or bats. Only staff/technicians that are listed under the SPUT Permit will be allowed to handle carcasses. Accurate identification of rare, special-status species will be emphasized during training. All surveyors will have photo cards to classify specimens and will take photographs of all finds. All data collection will be standardized and the approved Avian

Biologist will decide which to report as survey observations; however, all observations that were not conclusive will be reported.

The trainer, curriculum, and training materials for training of non-biologist personnel in monitoring methods will be approved by the BLM in consultation with the wildlife agencies and will be conducted by the approved Avian Biologist prior to initiation of the study. Training materials may be augmented by wildlife agency input. Components of the training program will include:

- A classroom-based portion with lecture and handout materials, and photographic or specimen-based (if available) species identification;
- A field-based portion that allows trainees the opportunity to practice and receive feedback on conducting carcass searches and trials, identification of species, completing data forms, and following protocols for assessing and assisting injured birds and bats;
- Assessment of learning outcomes for each participant; and
- A training log to be updated with each trainee's name and contact information upon successful completion of the course.

The Avian Biologist that will conduct the training will, minimally, have a Master's degree in biological sciences, zoology, botany, ecology, or a related field, and at least one year of field experience with avian or bat research or monitoring in the region. All reference material should be maintained and provided to the agencies in the event that there are questions about species identification.

6.0 REPORTING

6.1 Reporting During Construction

The Project will report all documented bird and bat injuries and fatalities to the BLM, CDFW and USFWS using the required Avian Injury and Mortality Reporting Form that is a reporting requirement of the USFWS SPUT Permit issued to the Project to authorize the handling of dead or injured birds. SPUT Permit reporting will be submitted monthly or in accordance with the terms of the permit. Similar reporting to the CDFW will be accomplished as a condition of any relevant Scientific Collecting Permit that the CDFW may issue to authorize the handling of dead or injured birds under state law.

6.2 Reporting During Operations

All injury and fatality incidents discovered outside of the standardized carcass surveys will be documented in the same manner as used for those discovered during the carcass surveys, and will be reported to the USFWS and CDFW as part of the SPUT Permit process. Special-status or listed species will also be handled in a way that is consistent with Project-specific SPUT Permit conditions.

6.2.1 Summary Reports

Semi-annual electronic summaries of all biological monitoring activities will be submitted to the BLM, USFWS, and CDFW throughout the monitoring period. After the completion of each year of monitoring, a biologist representing the Project will assist the Project in preparing and submitting an annual report that summarizes dates, durations, and results of all fatality monitoring conducted, to the BLM, CDFW, and USFWS. During each monitoring year there will be one interim report and one final annual report.

To address the specific objectives of the monitoring plan, semi-annual reports will include summaries of fatalities detected, searcher efficiency trials, carcass persistence trials, and may include recommendations for possible adaptive management actions; adjusted fatality estimates will only be presented in the final, annual report. All reports will present summaries of detection by species and project component. Special status species, if detected, will be treated separately.

The final annual report will present summaries of all data collected during fatality monitoring over the previous year, including adjusted fatality estimates by seasons and for the entire year. In addition, to the extent possible, fatality rates will be estimated and reported for likely diurnal, and likely nocturnal species, and for ecological guilds of interest (e.g., raptors, water-associated birds, passerines). Summary reports will also include (if sample sizes are sufficient) spatial analyses of the data that address whether fatalities are randomly distributed throughout the facility. All raw field notes, field data, photographs, and Geographic Information System (GIS) data will be submitted to the agencies with the annual report. After the first year of monitoring has passed, results from the annual report will be reviewed to determine if adjustments to the monitoring frequency are warranted based on searcher efficiency and carcass persistence trial results.

7.0 ADAPTIVE MANAGEMENT

PSH will implement an adaptive management approach at the Project from pre-construction through the period of post-construction monitoring. Adaptive management will follow a data-driven approach whereby problems are assessed in the context of other sources of anthropogenic impact to avian and bat species, in particular other solar facilities. The guiding principles associated with adaptive management are:

- Recommendations will be made based on best available science and existing approvals and permits to address specific issues resulting from the Project;
- Recommendations will be assessed by all agencies involved, as well as representatives for the Project;
- Provide sufficient flexibility to adapt as more is learned about the Project as well as strategies to reduce avian impacts, if warranted;

- Review results of fatality monitoring;
- Review annual report on status of compliance with mitigation measures and permit conditions and provide recommendations to the BLM and Riverside County equivalent, as necessary.
- Implement adaptive management program measures of Applicant Proposed Measure (APM) 52 to reduce or offset mortalities caused by the Project.
- Evaluate effectiveness of implemented adaptive management strategies and provide the BLM and Riverside County equivalent with recommendations based on findings.

Per APM 52: "*The Project owner shall implement a bird and bat adaptive management program that includes potential measures the Project owner can implement to adaptively respond to detected mortality and injuries attributable to the Project. Adaptive actions undertaken will be discussed and evaluated in survey reports prepared under the Project's BBCS. Any impact reduction measures must be commensurate (in terms of factors that include geographic scope, costs, and scale of effort) with the level of avian or bat mortality or injury that is specifically and clearly attributable to the Project facilities, consistent with the nexus and proportionality requirements of California statutory and constitutional law and of U.S. constitutional law.*

a. Performance Standards. Appropriate performance standards for mitigation of impacts to any species regulated by BGEPA, ESA, and CESA exist through required consultation with USFWS and CDFW under their respective regulatory and permitting frameworks, as specified in Tier 1 Measures, below. For impacts to all other special status avian and bat species, adaptive management measures must reduce or offset mortalities caused by the Project to a level that avoids a substantial, long-term reduction in the demographic viability of the population of the species in question, as estimated through implementation of the Project BBCS, which employs the structured approach set forth in the USFWS Land-Based Wind Energy Guidelines (USFWS 2012).
b. Impact Reduction Measures.
i. Tier 1 Measures.
In addition to the monitoring requirements described in the Project BBCS, the following measures shall be implemented to achieve the above performance standards:
1) The Project owner shall initiate consultation with USFWS and CDFW if there is a Project attributed injury or mortality to any species regulated by BGEPA, ESA or CESA.
2) PSPP MM BIO-1: Designated Biologist Selection and Qualifications
3) PSPP MM BIO-2: Designated Biologist Duties
4) PSPP MM BIO-3: Biological Monitor Selection and Qualifications
5) PSPP MM BIO-4: Biological Monitor Duties
6) PSPP MM BIO-6: Worker Environmental Awareness Program (WEAP)
7) PSPP MM BIO-8: Impact Avoidance and Minimization Measures (e.g., 1. Limit disturbance areas; 2. Minimize road impacts; 3. Minimize traffic impacts; 4. Monitor during construction; 5. Minimize impacts of transmission/pipeline alignments, roads, and staging areas; 6. Avoid use of

toxic substances; 7. Minimize lighting impacts; 8. Minimize noise impacts; 12. Minimize standing water; 13. Dispose of road-killed animals; 14. Minimize spills of hazardous materials; 15. Worker guidelines; 17. Monitor ground disturbing activities prior to pre-construction site mobilization; 18. Control unauthorized use of the project access roads; 20. Avoid spreading weeds)

8) PSPP MM BIO-12: Desert Tortoise Compensatory Mitigation

9) PSPP MM BIO-13: Raven Management Plan and Fee

10) PSPP MM BIO-14: Weed Management Plan

11) PSPP MM BIO-15: Pre-Construction Nest Surveys and Avoidance Measures

12) PSPP MM BIO-16: Avian Protection Plan

13) PSPP MM BIO-18: Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures

14) BIO-19: Special-Status Plant Impact Avoidance, Minimization and Compensation

15) PSPP MM BIO-21: Mitigation for Impacts to State Waters (e.g., 1. Acquire offsite state waters)

16) PSPP MM BIO-25: Golden Eagle Inventory and Monitoring

17) PSPP MM BIO-26: Evaporation Pond Netting and Monitoring

18) PSPP MM VIS-03: Temporary and Permanent Exterior Lighting (e.g., minimize visibility, minimize glare, minimize illumination)

19) PSPP MM VIS-04: Project Design (e.g., minimize the number of structures, reduce the amount of disturbed area)

20) APM-1: Designated Biologist

21) APM-2: Worker Education Program

22) APM-4: Integrated Weed Management Actions

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23) APM-6: Noise Controls for Special-Status Species

24) APM-7: Standard Practices to Protect Special Status Species (e.g., prohibition of domestic pets)

25) APM-16: Bendire's Thrasher Monitoring

26) APM-17: Passive Burrow Exclusion

27) APM-18: Golden Eagle Nest Avoidance

28) APM-19: Golden Eagle Compensation

29) APM-20: Contribution to Golden Eagle Monitoring Program

30) APM-42: Manage Visual Resources as VRM Class IV

31) APM-45: Visual Design Standards

32) APM-46: Required Visual Resource BMPs

ii. Tier 2 Measures.

If Tier 1 measures do not achieve the performance standards described above, the monitoring results of the Project, as well as those of other PV projects and the results of their respective impact reduction efforts, will be analyzed to formulate additional impact reduction measures to achieve the performance standards. Such measures may include, but not be limited to:

1) Use of a secure cover or floating, high-density plastic balls to cover construction ponds, as recommended by the Federal Avian Administration's "Wildlife Hazard Management at Airports" manual.

2) Passive avian diverter installations along the perimeter or at other locations within the Project to reduce or minimize bird use of the site.
3) The use of sound, light or other means to discourage site use consistent with applicable legal requirements.
4) Onsite habitat management or prey control measures consistent with applicable legal requirements.
5) Modifications to support structures or other facilities to exclude nesting birds (e.g., netting or shielding around framework; capping open pipes or tubing).
iii. Tier 3 Measures.
In the event Tier 1 and Tier 2 avoidance and minimization measures do not meet the above performance standards, or upon election of the Project owner, the Project owner shall implement compensatory mitigation on terms and at ratios deemed appropriate by USFWS and/or CDFW to meet the performance standard applicable to the species in question. Such measures shall be approved by USFWS and/or CDFW and may include, but not be limited to:
1) Restoration of degraded off-site habitat with native vegetation.
2) Restoration of off-site agricultural fields to bird habitat.
3) Management of off-site agricultural fields to enhance bird populations.
4) Retrofitting of structures to minimize collisions.
5) Support for avian and bat research and/or management efforts conducted by entities approved by the USFWS and CDFW within the Project's mitigation lands or other approved locations.
6) Funding efforts to address avian diseases or depredation due to the expansion of predators in response to anthropomorphic subsidies that may adversely affect birds that use the mitigation lands or other approved locations.
7) Contributions to the Migratory Bird Conservation Fund managed by the Migratory Bird Conservation Commission."

If deemed warranted by agencies, a technical advisory group (TAG) will be formed to facilitate the adaptive management approach described in APM 52. If a TAG is formed, the TAG will consist of one member of the BLM, USFWS, and CDFW. Two additional non-voting members, representing PSH, would serve as members of the TAG. Person(s) with scientific expertise may be invited by TAG members, if deemed appropriate. In addition, representatives from the Project and the consultants involved in the conduct of the studies will typically be invited to attend and participate in TAG meetings. The TAG will provide advice and recommendations to the BLM on developing and implementing effective measures to monitor, avoid, minimize, and mitigate impacts to wildlife species and their habitats related to operations. The BLM will evaluate any recommendations of the TAG, including discussions with PSH concerning new measures or measures that are not completely detailed in this BBCS, requisite effectiveness monitoring, and make a decision on what measure(s) and monitoring to require for implementation. It is assumed that cost will be a factor when recommending any changes to the monitoring protocol. Accordingly, any adaptive management measures should strive to identify monitoring modification(s) that offset costs with no net change. Palen Solar III and the agencies (or TAG, if created) will also meet at the end of the second year of monitoring to determine if continued/focused monitoring is warranted.

8.0 REFERENCES

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Appendix A. Summary of Study Methods for Pre-project Surveys

Bird Use Count Surveys

Methods

Bird use count (BUC) surveys were conducted by BBI during the spring (April 8 – May 4; BBI 2013a) and summer (May 5 – June 1; BBI 2013b) of 2013 and by Western EcoSystems Technology, Inc. (WEST) during the fall of 2013 (August 20 – December 13; Levenstein et al. 2014a), spring of 2014 (March 24 – June 05; Levenstein et al. 2014b), and spring 2015 (March 09 – June 05, 2015; Levenstein et al. 2015). The objective of the BUC surveys was to estimate the spatial and temporal use of the Project by medium to large birds, particularly vultures and diurnal raptors (i.e., kites, accipiters, buteos, northern harriers [Circus cyaneus], eagles, falcons and osprey [Pandion haliaetus]). Point counts using circular plots (similar to those described by Reynolds et al. 1980, Bibby et al. 1992) were conducted at six BUC observations points established throughout the PSEGS site and surrounding 0.6-mile buffer, through fall 2013; two of the six original BUC observation points in the interior of the Project footprint were surveyed during the spring 2014 season (points 3 and 5, Figure 4). Each survey plot was an 800-m (2,625-ft) radius circle centered on the point. From April 8 to May 4, and from August 20 – December 13, surveys at each observation point were conducted for approximately eight continuous hours per day (between approximately 6:00 am and 7:00 pm), four days per week. From May 5 to June 1, surveys at each observation point were conducted for approximately eight continuous hours per day (between approximately 6:00 am and 7:00 pm), one day per week.

Survey methods were consistent with those used by the Hawk Migration Association of North America, with observers continuously scanning the sky and surrounding areas for target species within the survey area. Observations of birds beyond 800-m radius were recorded, but were not included in statistical analyses. For each observation, the following data were recorded: observation number, start and end time of each observation, species or best possible identification, number of individuals, sex and age class (if possible), altitude above ground level (AGL) when first observed, highest and lowest altitude AGL, distance from plot center when first detected, closest distance, general flight direction, activity (behavior), and habitat(s). Flight or movement paths for all raptors and vultures were mapped onto US Geological Survey (USGS) base maps, given corresponding observation numbers, and digitized using ArcGIS software. Additionally, for each golden eagle observed, data were recorded every minute that the bird was within view, as recommended in the USFWS Eagle Conservation Plan Guidance (USFWS 2013).

Small Bird Count Surveys

Methods

To date, six seasons of small bird count (SBC) surveys have been conducted at the Project site. At the original PSPP, SBC surveys were conducted by EDAW AECOM and BBI (2009) in the spring of 2009. While the Project was known as the PSEGS, SBC surveys were conducted by BBI during the spring of 2013 (April 9 – June 29; BBI 2013a) and by WEST during the fall of

2013 (August 19 – November 14; Levenstein et al. 2014a) and spring of 2014 (March 24 – June 05; Levenstein et al. 2014b). While the project was known as AGS, surveys were conducted in

the spring of 2015 (March 16 – June 05; Levenstein et al. 2015). The objective of the SBC surveys was to characterize use by migrant and resident birds, particularly songbirds, within the site and surrounding area during the spring and fall migration periods. While data collection methods and survey point locations were generally consistent between survey year and seasons, the number of overall survey points varied somewhat. In 2009, a total of 48 points, located along six transects within the PSPP project boundary, were surveyed between April 12 and May 8. During the spring, summer, and fall of 2013, 120 points, 176 points, and 150 points, respectively, were surveyed throughout the PSEGS site and surrounding 1.0-mile (1.6-km) buffer. During the spring of 2014, a reduced survey effort was implemented and only 72 of the 150 points surveyed during the fall of 2013 were sampled (Figure 5a). The spring 2015 survey was further reduced the number of survey points to 64 of the 150 fall 2013 survey stations (Figure 5b); however, these stations were chosen to accommodate the substantially smaller footprint of the AGS project (Levenstein et al. 2015).

During the spring of 2013 (April 9 – May 1) a total of 120 points were surveyed. During the summer of 2013 (May 2 – June 29), the survey effort was increased to include 186 points. For the fall 2013 survey effort (August 19 – November 14), the number of points was reduced to 150. During each season, points were separated by at least 810 ft (247 m) to ensure independence of observations. The SBC points were surveyed once per week during the spring 2009, spring and summer 2013, and fall 2013 study periods, with all surveys conducted between 15 minutes (min) before dawn and six hours after dawn to maximize the probability of detecting the target species (i.e., passerines). Surveys at each station consisted of a 10-min passive listening survey, during which time all species seen or heard were recorded. Though birds of all sizes and at all distances from the observer were recorded, an emphasis was placed on detecting all birds within 100 m (328 ft) of the observer. For each bird detected, the following data were recorded: station number, species, sex (if known), age (if known), distance from point count station, direction from station, flight height upon initial observation, flight direction, mode of detection (visual, song, call, other), and activity. If a sensitive species was detected, additional data, such as location (Universal Transverse Mercator [UTM] coordinates), were recorded.

Mist-Net Surveys

Methods

Avian mist-net (MN) surveys were conducted by BBI during the spring (April 11 – May 4; BBI 2013a) and summer (May 9 – June 14; BBI 2013b) of 2013 and by WEST during the fall of 2013 (September 18 – October 30; Levenstein et al. 2014a). The MN surveys were conducted as a supplement to SBC surveys to increase the probability of detecting inconspicuous birds that might otherwise go undetected. From April 11 – May 4, MN surveys were conducted for eight days at eight MN stations, with each MN station consisting of net arrays placed around three adjacent SBC point count stations in the same habitat type. A total of 12 standard 2.6 x 12 m

(8.5 x 39 ft) MN were used daily at each MN station, with four nets placed within 50-100 m (164-328 ft) to the north, south, east, and west, respectively, of each of the three SBC stations that comprised the single MN station. The eight MN stations were equally divided among habitat types, with four each in Desert Dry Wash Woodland and Sonoran Creosote Scrub, and equally divided in regard to areas of proposed Project permanent impact, with four MN stations in areas of proposed permanent disturbance and four in areas adjacent to proposed permanent disturbance. The MN surveys were conducted twice per week, with one survey at a MN station in Desert Dry Wash Woodland and the other in Sonoran Creosote Scrub habitat.

From May 9 – June 14, one of six MN stations was surveyed each week for three consecutive days. Three of these stations were situated in Desert Dry Woodland Wash habitat within the Project boundary and three were situated within the palm plantation immediately adjacent to and on the northwest edge of the Project site, in an area where the overstory consisted of date palm trees (Phoenix dactylifera) and the understory consisted of cultivated citrus trees with dense foliage. At each MN station, a total of 12 standard 2.6 x 12 m mist nets were arranged in two or three lanes, each with four to six nets strung together. On occasion, more than 12 nets were set up at a station to take advantage of active areas that were discovered after setting up the initial net lanes. These "Extra" nets were in addition to the 12 "Standard" nets and were sometimes placed outside of the targeted habitat for a MN station. As such, the results for Standard and Extra net lanes are presented separately. Net lanes were generally arranged within 50-100 m of one another at a given MN station, and placed among vegetative features at the MN station so as to minimize visibility and maximize the probability of capture. All MN lanes were arranged along the east-west axis.

During the fall study, MN surveys were conducted for three consecutive days (ambient conditions permitting) each week at one of four rotating stations. Two MN stations were located within Desert Dry Wash Woodland (stations 1 and 3) one station was located within Sonoran Creosote Scrub (station 2), and one station was located within the palm plantation (station 4; Figure 7). At each MN station, during both spring and fall studies, 12 standard 2.6 x 12 m MN were used with nets placed so as to minimize detection by small birds (e.g., out of direct sunlight to the extent possible, proximate to shrubs and/or trees when present). At each station, nets were opened at approximately dawn (between 6:00 am and 7:00 am) and remained open for approximately four hours or until conditions (i.e., temperature, wind, precipitation) required nets to be closed. All birds captured in nets were removed carefully, banded with a unique aluminum USFWS leg band, and released. Additionally, information recorded for all captured birds included: date, time, station, net number, bander's name, species, band number, molt, level of stored fat, and feather/plumage characteristics, and when possible, age and sex.

Winter 2013 Golden Eagle Surveys

Methods

Winter golden eagle surveys were conducted at the Project by BBI from January 23 to February 27, 2013 (BBI 2013d). The purpose of the surveys was to evaluate use of the Project and surrounding region by wintering and resident golden eagles using a combination of baited

camera traps and visual surveys. Camera trapping was used to gauge the use of lands within the study area by golden eagles and other wildlife, as golden eagles will regularly utilize carrion as a food source when it is available. Carcasses were placed as bait, staked to the ground at locations selected based on habitat features spread out across the study area near accessible roads. Reconyx™ 500 series cameras were staked within 15 ft (4.6 m) of the carcass to capture all visiting predators and scavengers. The cameras were set to record activity at a minimum of a picture every five seconds and were in operation 24 hours per day from the time of set-up to removal of the station. Image data stored on the camera memory cards were retrieved and downloaded during weekly survey visits to document all activity. Stations were left operating from the initial set-up date until the surveys ended or until evidence of lack of activity dictated taking down or moving the station. Bait station 1 was in operation for five weeks, station 2 for four weeks, stations 3 and 4 in operation for six weeks, station 6 for five weeks, and station 7 for three weeks. Camera trapping operations were conducted constantly from January 23 to February 27, 2013.

Visual surveys for golden eagles and other avian predators were conducted during each visit to the study area by driving all accessible roads and stopping at random locations and scanning the skyline and potential perch locations such as cliffs, rock outcroppings and trees with high powered binoculars and spotting scopes. Observations were also conducted from the location of each bait station. Large areas of the Palen Mountains and Coxcomb Mountains, as well as smaller portions of the Chuckwalla Mountains, were not accessible and not adequately surveyed. Intensive bird use surveys, designed to document use of the Project by resident and migrating eagles and other raptors, were conducted within the PSEGS boundary during the spring and fall of 2013 (see Section 2.2.1).

Eagle Nest Surveys

Methods

Spring aerial and ground golden eagle nesting surveys were conducted by BBI between March 20 and April 15, 2013 (BBI 2013c). Aerial surveys were conducted by helicopter on April 6 and 7, 2013, within 10 miles of the Project. Surveys covered all areas of suitable golden eagle nesting habitat and known eagle nest sites within the Palen Mountains and the Chuckwalla Mountains, including transmission structures along the I-10 power lines. Due to bighorn sheep (Ovis canadensis) lambing season flight restrictions, aerial surveys in the Chuckwalla Mountains were conducted from heights of greater than 1,500 ft (457 m) AGL in all areas. Aerial surveys were conducted in a helicopter (Bell Jet Ranger) and followed the survey methodology described in Pagel et al. (2010) to the extent possible. During surveys, all areas within the study area were searched for large stick nests used by golden eagles and other raptors on cliff faces and transmission towers. Three follow-up ground-based surveys were conducted on foot in the Chuckwalla Mountains between the dates of April 8 and April 15, 2013, to visit and observe potential golden eagle nest sites identified during aerial surveys. Three additional days of foot and vehicular surveys were conducted on March 20, 21, and 22, 2013, in the Coxcomb Mountains, which could not be surveyed by helicopter at any reasonable height due to flight restrictions in Joshua Tree National Park.

Summer aerial and ground golden eagle nesting surveys were conducted between May 24 and August 3, 2013. Aerial surveys were conducted by helicopter on May 24 and 25, 2013, in the southern Palen Mountains and along a 20-mile (32-km) length of the Devers-Palo Verde #2 transmission lines that follow the I-10 freeway corridor, and again on August 2-3 in the Chuckwalla Mountains, when aircraft flight restrictions related to bighorn sheep lambing no longer applied in this area. Summer ground surveys were conducted in the Coxcomb Mountains on May 24 and 25, 2013, and again for three days on June 9, 11, and 15, 2013.

Spring and summer aerial and ground golden eagle nesting surveys were also conducted April 08 – 12 and July 01 – 03, 2014. Aerial surveys were conducted on April 09 and July 01 – 03, 2014 within a 10-mile (16-km) buffer of the boundary for the proposed Project at the time. Ground-based surveys were also conducted during the entire April survey period, during which all previously documented eagle nests were visited, and observers scanned for suitable habitat for new nests. As in other seasons, aerial surveys were limited due to restrictions for bighorn sheep lambing.

Spring ground-based golden eagle nesting surveys were conducted between March 10 and March 19, 2015, to obtain the status of previously documented golden eagle nests within a 10-mile buffer of the AGS project (WEST 2015). Aerial surveys were not performed during this time period due to flying restrictions as a result of desert bighorn sheep lambing activity.

Golden Eagle Prey Abundance Surveys

Methods

Golden eagle prey abundance surveys were conducted concurrently with SBC surveys by BBI during the spring of 2013, from April 9 to June 29 (BBI 2013a, 2013b). Prey abundance surveys were conducted as surveyors walked along transects between SBC survey points and recorded the number of black-tailed jackrabbits (Lepus californicus) and desert cottontails (Sylvilagus audubonii) detected incidentally since leaving the previous station. These data provide relative measures of abundance which are spatially linked to SBC station locations for these two species.

Burrowing Owl Surveys

Methods

In the spring of 2009 (March 10 – June 14), breeding burrowing owl surveys were conducted throughout the original PSPP by EDAW AECOM (2009). Surveys were performed in conjunction with desert tortoise (Gopherus agassizii) surveys, and were consistent with the survey protocol established by the California Burrowing Owl Consortium (CBOC 1993) and accepted by the CDFW. Surveyors walked slowly and systematically along transects, spaced 10 m (33 ft) apart, throughout the entire disturbance area and a 150-m (492-ft) buffer, while visually searching for burrowing owls, their sign (e.g., pellets, whitewash, feather, bones, etc.), and burrows potentially

suitable for use by burrowing owls. All burrowing owl observations, sign, and burrows (regardless of sign presence) were mapped using global positioning system (GPS) units and recorded on datasheets. A minimum of four visits were made to each mapped burrow and carefully examined for burrowing owl sign. All burrows with owl sign were surveyed three additional times during the breeding season to determine burrowing owl presence.

In the spring of 2013, supplemental burrowing owl surveys were conducted by Dr. Alice Karl (Karl 2013) along portions of the Project linear facilities (gen-tie line and natural gas pipeline) that were modified from the original PSPP and not included in the 2009 survey effort; however, the original Project was not resurveyed at this time. Surveys were consistent with the most recent burrowing owl survey guidelines (CDFG 2012) and consisted of four field visits during the breeding season, April 7 – June 26. During each field visit, surveyors walked a transect along the center of the corridor for both the modified gen-tie (120 ft [approximately 40 m] wide) and gas line (50 ft [approximately 20 m] wide), as well as buffer transects spaced at 20-m intervals, out to 120 m (394 ft) from the corridor edges.

In spring and summer 2016, the site was surveyed using 10-to-20 meter spaced transects. All burrows observed during surveys were inspected for burrowing owl sign. All burrows with sign identified in spring 2016 were revisited in summer 2016

Agricultural Pond Surveys

Methods

WEST conducted weekly surveys at the three agricultural ponds within the privately-owned land to the northwest of the Project site and just beyond the palm plantation during the fall of 2013 (August 19 – December 10; Levenstein et al. 2014a), spring of 2014 (March 24 – June 05; Levenstein et al. 2014b), and spring of 2015 (March 13 – June 03, 2015; Levenstein et al. 2015). The objective of the surveys was to evaluate use of three agricultural ponds adjacent to the northwest boundary of the Project site by species that associate with water (e.g., migratory shorebirds, waterbirds, and waterfowl) that might go unobserved during BUC surveys conducted within the Project boundary. While the focus of the surveys was migratory water-dependent species, all medium to large birds seen or heard during each survey were recorded. One survey point was established at each of three agricultural ponds (Figure 4) and each point was surveyed for approximately 2.5 hours during each visit for a total of approximately eight hours of total survey time in the pond area each week; one of the points was dropped for the spring 2014 survey period. Points were selected to achieve good visual coverage of each pond and the surrounding landscape. Each survey plot was an 800-m radius circle centered on the point. Data collection methods were identical to those used during BUC surveys (see Section 2.2.1.1 above). Observations of all water-dependent species and other medium to large birds beyond the 800-m radius were recorded, but were not included in statistical analyses.

Nocturnal Migration Radar Surveys

Methods

WEST conducted nocturnal migration radar surveys at the Project during the fall of 2013 (August 12 – October 31; Levenstein and Nations 2014). The goals of the radar survey were to document and measure nocturnal migration over the Project area, and assess risk related to the proposed infrastructure of PSEGS, which included a tall tower with illumination at night. Surveys employed a mobile radar lab consisting of a mobile X-band marine radar unit mounted on a converted van. The X-band radar unit transmitted at 9,410 megahertz with peak power output of 12 kilowatts, and was similar to other radar labs used to study development sites throughout the US. A single radar site was monitored from approximately sunset until sunrise on approximately 50 nights during the late summer-fall 2013 migration period, with radar coverage of approximately 90% achieved in both horizontal and vertical modes. The radar system used in this study has several controls which affect recognition and tracking of targets. A "target" refers to a single radar echo. A target may represent more than one bird or bat if individuals are flying close together. Targets with air speeds less than 6.0 m/second (m/s; 19.7 ft/s; likely insects) or greater than 35.0 m/s (114.8 ft/s; aircraft) were judged not to be birds or bats and were excluded from further analysis of the data.

Acoustic Bat Surveys and Bat Roost Surveys

Methods

In 2009, EDAW AECOM conducted a 1-day survey for bat roosts within the original PSPP and surrounding region (EDAW AECOM 2009a). During baseline surveys for the Project in spring of 2013, an additional bat roost survey was conducted within one mile of the modified linear facilities for the Project (Karl 2013). During both survey efforts, potential roosting habitat (e.g., freeway underpasses, bridges, buildings) were examined for signs of bat roosting.

Acoustic bat surveys were conducted at the Project in May 2013 and October through mid-December 2013 (Brown and Rainey 2013, 2014). The goal of the surveys was to assess the potential for bat roosting and foraging at the site. A list of the bat species with potential to occur on the site is shown in Table 5. The initial acoustic monitoring was conducted for four nights, from May 11 through May 14, 2013, to sample bats utilizing the Project site. Passive acoustic monitors consisting of an ultrasound detector and a programmable data storage device (AnaBat II and CF-ZCAIM; Titley Electronics, Ballina, New South Wales, Australia) were deployed at 13 locations throughout the Project (Figure 11). All acoustic monitors were placed three ft (one m) above the ground on poles. Half of the detectors had standard Titley ultrasonic microphones (20 kilohertz [kHz] to greater than 120 kHz) and half had low-frequency microphones with the same ultrasonic capability, but higher sensitivity to sounds in the audible range (4.5 to 20 kHz). Higher sensitivity microphones enhance recognition of human audible bat sounds (e.g., pallid [Antrozous pallidus] and California leaf- nosed bat [Macrotus californicus] social calls, and hoary bat [Lasiurus cinereus], western mastiff [Eumops perotis], and other larger free-tail bat calls), but also increases the probability of recording insects, rodents, birds, and leaf rustle.

A second acoustic survey was conducted in the fall of 2013, from October 7 through December 14. This survey effort consisted of four AnaBat SD1 ultrasonic detectors with standard microphones deployed at four sites throughout the Project, including three of the same site

sampled during the spring of 2013 and a new site at a large constructed pond adjacent to the agricultural property, approximately one km from the northwest corner of the Project site (Figure 11).

Acoustic data were analyzed using Analook W 3.9c (available at: www.hoarybat.com/Beta), as well as visual examination of call sequences. In this analysis, three multispecies acoustic categories are M50 (typically steep calls that end near 50 kHz) and in the Project could include two species of Myotis bats (Yuma myotis [M. yumanensis] and California myotis [M. californicus]); Q25 (calls ending near 25 kHz attributable to several mid-frequency larger species); and LACI/NYFE calls (largely below 20 kHz) that are attributable to either hoary bats or pocketed free-tailed bats (Nyctinomops femorosacca). All M50 calls were assigned to California myotis based on knowledge of distributional and habitat information. Relative activity rates presented in the results represent counts of 1-min intervals during the night that had at least one identified sequence file for a species or multispecies category (activity index of Miller 2001).

Appendix B. All Bird Types and Species Observed at the Palen Photovoltaic Solar Project during Bird Use Count Surveys, August 20 – December 13, 2013, and March 24 – June 5, 2014

Appendix B1. Summary of the number of observations and groups recorded by species and bird type during bird use count surveys at the Palen Photovoltaic Solar Project[a], August 20 – December 13, 2013, and March 24 – June 5, 2014.

		Fall 2013		Spring 2014		Overall	
Type / Species	*Scientific Name*	# grps	# obs	# grps	# obs	# grps	# obs
Waterbirds		**132**	**1,090**	**4**	**13**	**136**	**1,103**
American white pelican	*Pelecanus erythrorhynchos*	9	32	0	0	9	32
double-crested cormorant	*Phalacrocorax auritus*	4	34	0	0	4	34
great blue heron	*Ardea herodias*	33	41	0	0	33	41
great egret	*Ardea alba*	43	119	1	2	44	121
sandhill crane	*Grus canadensis*	6	57	0	0	6	57
snowy egret	*Egretta thula*	3	3	0	0	3	3
unidentified bittern		0	0	1	3	1	3
unidentified egret		2	5	0	0	2	5
unidentified waterbird		1	16	0	0	1	16
white-faced ibis	*Plegadis chihi*	31	783	2	8	33	791
Gannets		**1**	**1**	**0**	**0**	**1**	**1**
blue-footed booby	*Sula nebouxii*	1	1	0	0	1	1
Waterfowl		**108**	**973**	**0**	**0**	**108**	**973**
American wigeon	*Anas americana*	1	1	0	0	1	1
blue-winged teal	*Anas discors*	4	23	0	0	4	23
cackling goose	*Branta hutchinsii*	2	2	0	0	2	2
Canada goose	*Branta canadensis*	12	117	0	0	12	117
cinnamon teal	*Anas cyanoptera*	1	11	0	0	1	11
gadwall	*Anas strepera*	1	1	0	0	1	1
greater white-fronted goose	*Anser albifrons*	5	195	0	0	5	195
green-winged teal	*Anas crecca*	3	10	0	0	3	10
northern shoveler	*Anas clypeata*	3	28	0	0	3	28
ring-necked duck	*Aythya collaris*	1	1	0	0	1	1
Ross' goose	*Chen rossii*	14	32	0	0	14	32
snow goose	*Chen caerulescens*	31	230	0	0	31	230
unidentified duck		16	182	0	0	16	182
unidentified goose		12	128	0	0	12	128
unidentified teal	*Anas spp*	1	7	0	0	1	7
unidentified waterfowl		1	5	0	0	1	5
Shorebirds		**50**	**404**	**2**	**2**	**52**	**406**
American avocet	*Recurvirostra americana*	11	276	0	0	11	276
black-bellied plover	*Pluvialis squatarola*	1	2	0	0	1	2
black-necked stilt	*Himantopus mexicanus*	2	43	0	0	2	43
greater yellowlegs	*Tringa melanoleuca*	4	4	1	1	5	5
killdeer	*Charadrius vociferus*	10	15	0	0	10	15

Appendix B1. Summary of the number of observations and groups recorded by species and bird type during bird use count surveys at the Palen Photovoltaic Solar Project[a], August 20 – December 13, 2013, and March 24 – June 5, 2014.

Type / Species	Scientific Name	Fall 2013 # grps	Fall 2013 # obs	Spring 2014 # grps	Spring 2014 # obs	Overall # grps	Overall # obs
least sandpiper	*Calidris minutilla*	8	14	0	0	8	14
long-billed curlew	*Numenius americanus*	5	5	0	0	5	5
mountain plover	*Charadrius montanus*	1	6	0	0	1	6
pectoral sandpiper	*Calidris melanotos*	1	1	0	0	1	1
semipalmated plover	*Charadrius semipalmatus*	1	1	0	0	1	1
short-billed dowitcher	*Limnodromus griseus*	1	1	0	0	1	1
unidentified shorebird		1	3	0	0	1	3
western sandpiper	*Calidris mauri*	4	33	0	0	4	33
whimbrel	*Numenius phaeopus*	0	0	1	1	1	1
Gulls/Terns		**65**	**495**	**2**	**2**	**67**	**497**
Bonaparte's gull	*Chroicocephalus philadelphia*	4	6	0	0	4	6
California gull	*Larus californicus*	12	108	0	0	12	108
Herring gull	*Larus argentatus*	5	49	0	0	5	49
laughing gull	*Leucophaeus atricilla*	3	6	0	0	3	6
mew gull	*Larus canus*	4	46	0	0	4	46
ring-billed gull	*Larus delawarensis*	24	184	0	0	24	184
unidentified gull		13	96	2	2	15	98
Shearwaters/Petrels		**1**	**17**	**0**	**0**	**1**	**17**
unidentified shearwater		1	17	0	0	1	17
Diurnal Raptors		**1,346**	**1,587**	**131**	**157**	**1,477**	**1,744**
<u>*Accipiters*</u>		*189*	*200*	*0*	*0*	*189*	*200*
Cooper's hawk	*Accipiter cooperii*	130	134	0	0	130	134
sharp-shinned hawk	*Accipiter striatus*	52	59	0	0	52	59
unidentified accipiter		7	7	0	0	7	7
<u>*Buteos*</u>		*588*	*740*	*95*	*117*	*683*	*857*
ferruginous hawk	*Buteo regalis*	9	9	0	0	9	9
red-shouldered hawk	*Buteo lineatus*	3	3	0	0	3	3
red-tailed hawk	*Buteo jamaicensis*	442	488	52	57	494	545
Swainson's hawk	*Buteo swainsoni*	130	236	40	56	170	292
unidentified buteo		2	2	3	4	5	6
zone-tailed hawk	*Buteo albonotatus*	2	2	0	0	2	2
<u>*Northern Harrier*</u>		*140*	*142*	*0*	*0*	*140*	*142*
northern harrier	*Circus cyaneus*	140	142	0	0	140	142
<u>*Eagles*</u>		*8*	*8*	*0*	*0*	*8*	*8*
golden eagle	*Aquila chrysaetos*	8	8	0	0	8	8
<u>*Falcons*</u>		*210*	*219*	*28*	*29*	*238*	*248*

Appendix B1. Summary of the number of observations and groups recorded by species and bird type during bird use count surveys at the Palen Photovoltaic Solar Project[a], August 20 – December 13, 2013, and March 24 – June 5, 2014.

		Fall 2013		Spring 2014		Overall	
Type / Species	***Scientific Name***	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
American kestrel	*Falco sparverius*	54	54	13	14	67	68
merlin	*Falco columbarius*	1	1	0	0	1	1
peregrine falcon	*Falco peregrinus*	2	2	0	0	2	2
prairie falcon	*Falco mexicanus*	149	158	15	15	164	173
unidentified falcon		4	4	0	0	4	4
Osprey		*91*	*109*	*0*	*0*	*91*	*109*
osprey	*Pandion haliaetus*	91	109	0	0	91	109
Other Raptors		*120*	*169*	*8*	*11*	*128*	*180*
unidentified hawk		23	28	4	4	27	32
unidentified raptor		97	141	4	7	101	148
Owls		**3**	**3**	**0**	**0**	**3**	**3**
burrowing owl	*Athene cunicularia*	1	1	0	0	1	1
short-eared owl	*Asio flammeus*	2	2	0	0	2	2
Vultures		**1,959**	**106,379**	**271**	**694**	**2,230**	**107,073**
turkey vulture	*Cathartes aura*	1,959	106,379	271	694	2,230	107,073
Upland Game Birds		**1**	**2**	**0**	**0**	**1**	**2**
ring-necked pheasant	*Phasianus colchicus*	1	2	0	0	1	2
Doves/Pigeons		**6**	**7**	**0**	**0**	**6**	**7**
common ground-dove	*Columbina passerina*	1	1	0	0	1	1
mourning dove	*Zenaida macroura*	3	4	0	0	3	4
rock pigeon	*Columba livia*	1	1	0	0	1	1
white-winged dove	*Zenaida asiatica*	1	1	0	0	1	1
Goatsuckers		**2**	**2**	**0**	**0**	**1**	**1**
lesser nighthawk	*Chordeiles acutipennis*	2	2	0	0	1	1
Large Corvids		**124**	**866**	**3**	**6**	**127**	**872**
American crow	*Corvus brachyrhynchos*	2	4	0	0	2	4
common raven	*Corvus corax*	122	862	3	6	125	868
Swallows		**927**	**2,439**	**120**	**375**	**1,047**	**3,486**
bank swallow	*Riparia riparia*	22	27	0	0	22	27
barn swallow	*Hirundo rustica*	547	1,536	32	63	579	1,599
cliff swallow	*Petrochelidon pyrrhonota*	102	206	30	84	132	290
northern rough-winged swallow	*Stelgidopteryx serripennis*	18	37	13	76	31	113
tree swallow	*Tachycineta bicolor*	50	126	19	70	69	196
unidentified swallow		134	355	19	53	153	408
violet-green swallow	*Tachycineta thalassina*	54	152	7	29	61	181

Appendix B1. Summary of the number of observations and groups recorded by species and bird type during bird use count surveys at the Palen Photovoltaic Solar Project[a], August 20 – December 13, 2013, and March 24 – June 5, 2014.

Type / Species	Scientific Name	Fall 2013		Spring 2014		Overall	
		# grps	# obs	# grps	# obs	# grps	# obs
Swifts/Hummingbirds		**83**	**307**	**12**	**19**	**95**	**326**
Anna's hummingbird	*Calypte anna*	1	1	0	0	1	1
black-chinned hummingbird	*Archilochus alexandri*	2	2	0	0	2	2
Costa's hummingbird	*Calypte costae*	4	4	1	1	5	5
unidentified hummingbird		3	3	6	6	9	9
unidentified swift		2	3	0	0	2	3
Vaux's swift	*Chaetura vauxi*	61	132	2	5	63	137
white-throated swift	*Aeronautes saxatalis*	10	162	3	7	13	169
Overall		**4,808**	**114,572**	**545**	**1,268**	**5,353**	**115,840**

[a] Within an unlimited viewshed

Appendix C. All Bird Types and Species Observed at the Palen Photovoltaic Solar Project during Shorebird/Waterfowl Surveys, August 19 – December 10, 2013, and March 27 – June 2, 2014

Appendix C. All Bird Types and Species Observed at the Palen [illegible] Solar Project during [illegible] Surveys, August 19 – December 17, 2013, and March [illegible] June 2, 2014

Appendix C1. Total number of groups and individuals for each bird type and species during shorebird/waterfowl surveys at the Palen Photovoltaic Solar Project[a], August 19 – December 10, 2013, and March 27 – June 2, 2014.

		Fall 2013		Spring 2014		Overall	
Bird Type / Species	Scientific Name	# grps	# obs	# grps	# obs	# grps	# obs
Loons/Grebes		**64**	**267**	**6**	**20**	**70**	**287**
Clark's grebe	*Aechmophorus clarkii*	3	29	0	0	3	29
eared grebe	*Podiceps nigricollis*	25	191	6	20	31	211
pied-billed grebe	*Podilymbus podiceps*	17	23	0	0	17	23
western grebe	*Aechmophorus occidentalis*	19	24	0	0	19	24
Waterbirds		**75**	**173**	**10**	**23**	**85**	**196**
American white pelican	*Pelecanus erythrorhynchos*	2	9	0	0	2	9
cattle egret	*Bubulcus ibis*	2	2	0	0	2	2
double-crested cormorant	*Phalacrocorax auritus*	7	7	0	0	7	7
great blue heron	*Ardea herodias*	21	28	2	2	23	30
great egret	*Ardea alba*	23	46	0	0	23	46
green heron	*Butorides virescens*	7	7	0	0	7	7
snowy egret	*Egretta thula*	2	2	1	1	3	3
unidentified bittern		0	0	1	2	1	2
white-faced ibis	*Plegadis chihi*	11	72	6	18	17	90
Waterfowl		**142**	**492**	**32**	**91**	**174**	**583**
American wigeon	*Anas americana*	10	24	2	2	12	26
blue-winged teal	*Anas discors*	9	21	2	2	11	23
bufflehead	*Bucephala albeola*	4	8	0	0	4	8
canvasback	*Aythya valisineria*	3	6	0	0	3	6
cinnamon teal	*Anas cyanoptera*	5	17	2	8	7	25
common goldeneye	*Bucephala clangula*	12	89	0	0	12	89
gadwall	*Anas strepera*	5	6	0	0	5	6
greater scaup	*Aythya marila*	2	2	0	0	2	2
green-winged teal	*Anas crecca*	16	66	1	1	17	67
hooded merganser	*Lophodytes cucullatus*	4	4	0	0	4	4
lesser scaup	*Aythya affinis*	4	13	0	0	4	13
long-tailed duck	*Clangula hyemalis*	0	0	8	8	8	8
mallard	*Anas platyrhynchos*	7	17	0	0	7	17
northern pintail	*Anas acuta*	7	8	2	4	9	12
northern shoveler	*Anas clypeata*	15	72	2	2	17	74
red-breasted merganser	*Mergus serrator*	0	0	1	1	1	1
redhead	*Aythya americana*	8	10	0	0	8	10
ring-necked duck	*Aythya collaris*	13	37	4	7	17	44
Ross' goose	*Chen rossii*	1	1	0	0	1	1
ruddy duck	*Oxyura jamaicensis*	14	79	8	56	22	135
snow goose	*Chen caerulescens*	2	2	0	0	2	2
unidentified teal	*Anas spp*	1	10	0	0	1	10
Shorebirds		**117**	**360**	**83**	**395**	**200**	**755**
American avocet	*Recurvirostra americana*	14	152	2	18	16	170
black-necked stilt	*Himantopus mexicanus*	3	7	4	6	7	13
dunlin	*Calidris alpina*	0	0	1	1	1	1
greater yellowlegs	*Tringa melanoleuca*	16	26	6	8	22	34
killdeer	*Charadrius vociferus*	27	51	7	9	34	60
least sandpiper	*Calidris minutilla*	21	53	19	109	40	162
lesser yellowlegs	*Tringa flavipes*	1	1	1	1	2	2
long-billed curlew	*Numenius americanus*	1	1	0	0	1	1
long-billed dowitcher	*Limnodromus scholopaceus*	3	4	7	16	10	20
pectoral sandpiper	*Calidris melanotos*	1	1	0	0	1	1

Appendix C1. Total number of groups and individuals for each bird type and species during shorebird/waterfowl surveys at the Palen Photovoltaic Solar Project[a], August 19 – December 10, 2013, and March 27 – June 2, 2014.

Bird Type / Species	Scientific Name	Fall 2013		Spring 2014		Overall	
		# grps	# obs	# grps	# obs	# grps	# obs
semipalmated sandpiper	*Calidris pusilla*	0	0	1	1	1	1
short-billed dowitcher	*Limnodromus griseus*	1	2	1	2	2	4
solitary sandpiper	*Tringa solitaria*	3	9	0	0	3	9
spotted sandpiper	*Actitis macularia*	12	15	12	43	24	58
unidentified dowitcher	*Limnodromus spp*	0	0	2	6	2	6
unidentified sandpiper		4	19	0	0	4	19
western sandpiper	*Calidris mauri*	5	11	11	77	16	88
willet	*Tringa semipalmata*	0	0	1	2	1	2
Wilson's phalarope	*Phalaropus tricolor*	1	4	8	96	9	100
Wilson's snipe	*Gallinago delicata*	4	4	0	0	4	4
Gulls/Terns		**21**	**112**	**4**	**5**	**25**	**117**
black tern	*Chlidonias niger*	2	2	1	1	3	3
Bonaparte's gull	*Chroicocephalus philadelphia*	3	8	1	1	4	9
California gull	*Larus californicus*	5	12	2	3	7	15
little gull	*Hydrocoloeus minutus*	1	1	0	0	1	1
ring-billed gull	*Larus delawarensis*	10	89	0	0	10	89
Rails/Coots		**29**	**165**	**11**	**23**	**40**	**188**
American coot	*Fulica americana*	29	165	11	23	40	188
Diurnal Raptors		**66**	**68**	**23**	**26**	**89**	**94**
American kestrel	*Falco sparverius*	1	1	1	1	2	2
Cooper's hawk	*Accipiter cooperii*	9	9	3	3	12	12
merlin	*Falco columbarius*	1	1	0	0	1	1
northern harrier	*Circus cyaneus*	6	7	1	1	7	8
osprey	*Pandion haliaetus*	4	4	0	0	4	4
peregrine falcon	*Falco peregrinus*	1	1	0	0	1	1
prairie falcon	*Falco mexicanus*	10	10	9	9	19	19
red-shouldered hawk	*Buteo lineatus*	1	1	0	0	1	1
red-tailed hawk	*Buteo jamaicensis*	24	25	5	8	29	33
sharp-shinned hawk	*Accipiter striatus*	3	3	1	1	4	4
Swainson's hawk	*Buteo swainsoni*	3	3	2	2	5	5
unidentified accipiter	*Accipiter spp.*	3	3	0	0	3	3
unidentified buteo	*Buteo spp.*	0	0	1	1	1	1
Vultures		**69**	**843**	**57**	**277**	**126**	**1,120**
turkey vulture	*Cathartes aura*	69	843	57	277	126	1,120
Upland Game Birds		**9**	**24**	**7**	**18**	**16**	**42**
ring-necked pheasant	*Phasianus colchicus*	9	24	7	18	16	42
Doves/Pigeons		**3**	**12**	**0**	**0**	**3**	**12**
Eurasian collared-dove	*Streptopelia decaocto*	3	12	0	0	3	12
Large Cuckoos		**2**	**2**	**0**	**0**	**2**	**2**
greater roadrunner	*Geococcyx californianus*	2	2	0	0	2	2
Goatsuckers		**1**	**9**	**1**	**25**	**2**	**34**
lesser nighthawk	*Chordeiles acutipennis*	1	9	1	25	2	34
Large Corvids		**5**	**51**	**0**	**0**	**5**	**51**
common raven	*Corvus corax*	5	51	0	0	5	51
Swallows		**147**	**585**	**97**	**402**	**244**	**987**
bank swallow	*Riparia riparia*	8	20	1	1	9	21
barn swallow	*Hirundo rustica*	82	446	30	125	112	571
cliff swallow	*Petrochelidon pyrrhonota*	12	24	18	92	30	116
northern rough-winged swallow	*Stelgidopteryx serripennis*	3	3	10	14	13	17

Appendix C1. Total number of groups and individuals for each bird type and species during shorebird/waterfowl surveys at the Palen Photovoltaic Solar Project[a], August 19 – December 10, 2013, and March 27 – June 2, 2014.

		Fall 2013		Spring 2014		Overall	
Bird Type / Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
purple martin	*Progne subis*	1	1	0	0	1	1
tree swallow	*Tachycineta bicolor*	33	73	30	150	63	223
unidentified swallow		3	4	2	3	5	7
violet-green swallow	*Tachycineta thalassina*	5	14	6	17	11	31
Swifts/Hummingbirds		**4**	**6**	**4**	**4**	**8**	**10**
Anna's hummingbird	*Calypte anna*	0	0	2	2	2	2
black-chinned hummingbird	*Archilochus alexandri*	0	0	1	1	1	1
Vaux's swift	*Chaetura vauxi*	4	6	0	0	4	6
white-throated swift	*Aeronautes saxatalis*	0	0	1	1	1	1
Overall		**754**	**3,169**	**335**	**1,309**	**1,089**	**4,478**

[a] Regardless of distance from observer

Appendix D. All Bird Types and Species Observed at the Palen Photovoltaic Solar Project during Small Bird Count Surveys, August 19 – November 14, 2013, and March 25 –June 4, 2014

Appendix D1. Total number of groups and individuals for each bird type and species during small bird count surveys at the Palen Photovoltaic Solar Project[a], August 19 – November 14, 2013, and March 25 – June 4, 2014.

		Fall 2013		Spring 2014		Overall	
Bird Type / Species	**Scientific Name**	**# grps**	**# obs**	**# grps**	**# obs**	**# grps**	**# obs**
Loons/Grebes		**14**	**85**	**0**	**0**	**14**	**85**
eared grebe	*Podiceps nigricollis*	6	65	0	0	6	65
pied-billed grebe	*Podilymbus podiceps*	3	11	0	0	3	11
western grebe	*Aechmophorus occidentalis*	5	9	0	0	5	9
Waterbirds		**29**	**189**	**10**	**21**	**39**	**210**
American white pelican	*Pelecanus erythrorhynchos*	1	1	0	0	1	1
cattle egret	*Bubulcus ibis*	1	8	0	0	1	8
great blue heron	*Ardea herodias*	5	6	0	0	5	6
great egret	*Ardea alba*	8	11	0	0	8	11
green heron	*Butorides virescens*	4	4	0	0	4	4
snowy egret	*Egretta thula*	3	3	0	0	3	3
unidentified bittern		0	0	10	21	10	21
white-faced ibis	*Plegadis chihi*	7	156	0	0	7	156
Waterfowl		**27**	**63**	**1**	**20**	**28**	**83**
American wigeon	*Anas americana*	1	1	0	0	1	1
blue-winged teal	*Anas discors*	4	13	0	0	4	13
bufflehead	*Bucephala albeola*	2	3	0	0	2	3
greater scaup	*Aythya marila*	2	2	0	0	2	2
green-winged teal	*Anas crecca*	2	6	0	0	2	6
northern shoveler	*Anas clypeata*	2	3	0	0	2	3
redhead	*Aythya americana*	4	4	0	0	4	4
ring-necked duck	*Aythya collaris*	2	3	0	0	2	3
ruddy duck	*Oxyura jamaicensis*	4	9	1	20	5	29
snow goose	*Chen caerulescens*	2	9	0	0	2	9
unidentified duck		1	8	0	0	1	8
unidentified teal		1	2	0	0	1	2
Shorebirds		**43**	**93**	**0**	**0**	**43**	**93**
American avocet	*Recurvirostra americana*	2	22	0	0	2	22
black-necked stilt	*Himantopus mexicanus*	3	19	0	0	3	19
greater yellowlegs	*Tringa melanoleuca*	3	4	0	0	3	4
killdeer	*Charadrius vociferus*	15	15	0	0	15	15
least sandpiper	*Calidris minutilla*	6	15	0	0	6	15
lesser yellowlegs	*Tringa flavipes*	1	2	0	0	1	2
long-billed dowitcher	*Limnodromus scholopaceus*	3	3	0	0	3	3
semipalmated plover	*Charadrius semipalmatus*	1	1	0	0	1	1
short-billed dowitcher	*Limnodromus griseus*	1	2	0	0	1	2
spotted sandpiper	*Actitis macularia*	4	4	0	0	4	4
unidentified dowitcher	*Limnodromus spp*	1	1	0	0	1	1
unidentified shorebird		1	1	0	0	1	1
western sandpiper	*Calidris mauri*	1	3	0	0	1	3
Wilson's snipe	*Gallinago delicata*	1	1	0	0	1	1
Gulls/Terns		**1**	**9**	**1**	**1**	**2**	**10**
Herring gull	*Larus argentatus*	1	9	0	0	1	9
unidentified gull		0	0	1	1	1	1
Rails/Coots		**8**	**48**	**0**	**0**	**8**	**48**
American coot	*Fulica americana*	8	48	0	0	8	48
Diurnal Raptors		**123**	**128**	**31**	**32**	**154**	**160**
American kestrel	*Falco sparverius*	5	6	7	7	12	13
Cooper's hawk	*Accipiter cooperii*	8	8	0	0	8	8
ferruginous hawk	*Buteo regalis*	2	2	0	0	2	2
northern harrier	*Circus cyaneus*	22	22	0	0	22	22

Appendix D1. Total number of groups and individuals for each bird type and species during small bird count surveys at the Palen Photovoltaic Solar Project[a], August 19 – November 14, 2013, and March 25 – June 4, 2014.

Bird Type / Species	Scientific Name	Fall 2013		Spring 2014		Overall	
		# grps	# obs	# grps	# obs	# grps	# obs
osprey	*Pandion haliaetus*	4	4	0	0	4	4
prairie falcon	*Falco mexicanus*	24	26	4	4	28	30
red-shouldered hawk	*Buteo lineatus*	2	2	0	0	2	2
red-tailed hawk	*Buteo jamaicensis*	42	43	13	13	55	56
sharp-shinned hawk	*Accipiter striatus*	3	4	0	0	3	4
Swainson's hawk	*Buteo swainsoni*	6	6	5	5	11	11
unidentified accipiter	*Accipiter spp*	1	1	0	0	1	1
unidentified buteo	*Buteo spp*	1	1	0	0	1	1
unidentified raptor		3	3	1	2	4	5
white-tailed kite	*Elanus leucurus*	0	0	1	1	1	1
Owls		**3**	**3**	**0**	**0**	**3**	**3**
burrowing owl	*Athene cunicularia*	2	2	0	0	2	2
short-eared owl	*Asio flammeus*	1	1	0	0	1	1
Vultures		**100**	**1877**	**63**	**148**	**163**	**2,025**
turkey vulture	*Cathartes aura*	100	1877	63	148	163	2,025
Upland Game Birds		**22**	**144**	**17**	**48**	**39**	**192**
California quail	*Callipepla californica*	0	0	1	2	1	2
Gambel's quail	*Callipepla gambelii*	22	144	16	46	38	190
Doves/Pigeons		**112**	**302**	**60**	**108**	**172**	**410**
Eurasian collared-dove	*Streptopelia decaocto*	10	23	2	3	12	26
mourning dove	*Zenaida macroura*	96	266	53	98	149	364
white-winged dove	*Zenaida asiatica*	6	13	5	7	11	20
Cuckoos		0	0	6	7	6	7
greater roadrunner	*Geococcyx californianus*	0	0	6	7	6	7
Goatsuckers		0	0	3	4	3	4
lesser nighthawk	*Chordeiles acutipennis*	0	0	3	4	3	4
Passerines		2,573	7,076	780	1,705	3,353	8,781
Blackbirds/Orioles		*52*	*194*	*36*	*71*	*88*	*265*
Brewer's blackbird	*Euphagus cyanocephalus*	6	21	0	0	6	21
brown-headed cowbird	*Molothrus ater*	7	7	0	0	7	7
Bullock's oriole	*Icterus bullockii*	3	3	4	5	7	8
European starling	*Sturnus vulgaris*	6	52	6	25	12	77
great-tailed grackle	*Quiscalus mexicanus*	15	78	25	37	40	115
red-winged blackbird	*Agelaius phoeniceus*	2	3	0	0	2	3
western meadowlark	*Sturnella neglecta*	0	0	1	4	1	4
yellow-headed blackbird	*Xanthocephalus xanthocephalus*	2	3	0	0	2	3
Corvids		379	1,002	109	150	488	1,152
common raven	*Corvus corax*	379	1,002	109	150	488	1,152
Finches/Crossbills		*354*	*1,124*	*47*	*93*	*401*	*1,217*
American goldfinch	*Spinus tristis*	2	2	0	0	2	2
house finch	*Haemorhous mexicanus*	337	1,098	44	81	381	1,179
Lawrence's goldfinch	*Spinus lawrencei*	1	1	0	0	1	1
lesser goldfinch	*Spinus psaltria*	14	23	0	0	14	23
unidentified finch		0	0	3	12	3	12
Flycatchers		*164*	*171*	*51*	*60*	*215*	*231*
ash-throated flycatcher	*Myiarchus cinerascens*	9	10	35	41	44	51
black phoebe	*Sayornis nigricans*	33	34	0	0	33	34
Cassin's kingbird	*Tyrannus vociferans*	0	0	1	2	1	2
gray flycatcher	*Empidonax wrightii*	0	0	1	1	1	1
Hammond's flycatcher	*Empidonax hammondii*	0	0	1	1	1	1
Pacific-slope flycatcher	*Empidonax difficilis*	0	0	2	4	2	4

Appendix D1. Total number of groups and individuals for each bird type and species during small bird count surveys at the Palen Photovoltaic Solar Project[a], August 19 – November 14, 2013, and March 25 – June 4, 2014.

Bird Type / Species	Scientific Name	Fall 2013 # grps	Fall 2013 # obs	Spring 2014 # grps	Spring 2014 # obs	Overall # grps	Overall # obs
Say's phoebe	*Sayornis saya*	112	117	8	8	120	125
unidentified flycatcher		1	1	1	1	2	2
western kingbird	*Tyrannus verticalis*	3	3	1	1	4	4
western wood-pewee	*Contopus sordidulus*	0	0	1	1	1	1
willow flycatcher	*Empidonax traillii*	6	6	0	0	6	6
Gnatcatchers/Kinglet		*96*	*122*	*34*	*50*	*130*	*172*
black-tailed gnatcatcher	*Polioptila melanura*	86	106	27	41	113	147
blue-gray gnatcatcher	*Polioptila caerulea*	5	9	5	6	10	15
ruby-crowned kinglet	*Regulus calendula*	5	7	2	3	7	10
Grassland/Sparrows		*567*	*2,798*	*147*	*259*	*714*	*3,057*
American pipit	*Anthus rubescens*	7	9	2	2	9	11
Bell's sparrow	*Artemisiospiza belli*	61	106	0	0	61	106
black-throated sparrow	*Amphispiza bilineata*	0	0	1	1	1	1
Brewer's sparrow	*Spizella breweri*	1	3	8	23	9	26
chipping sparrow	*Spizella passerina*	4	5	1	2	5	7
dark-eyed junco	*Junco hyemalis*	1	2	0	0	1	2
horned lark	*Eremophila alpestris*	446	2,541	127	204	573	2,745
house sparrow	*Passer domesticus*	2	2	0	0	2	2
lark sparrow	*Chondestes grammacus*	1	1	0	0	1	1
Lincoln's sparrow	*Melospiza lincolnii*	3	4	0	0	3	4
Savannah sparrow	*Passerculus sandwichensis*	4	9	1	1	5	10
song sparrow	*Melospiza melodia*	1	1	0	0	1	1
unidentified sparrow		5	7	0	0	5	7
white-crowned sparrow	*Zonotrichia leucophrys*	31	108	7	26	38	134
Mimids		*45*	*48*	*6*	*6*	*51*	*54*
crissal thrasher	*Toxostoma crissale*	1	1	0	0	1	1
Le Conte's thrasher	*Toxostoma lecontei*	39	42	6	6	45	48
northern mockingbird	*Mimus polyglottos*	4	4	0	0	4	4
sage thrasher	*Oreoscoptes montanus*	1	1	0	0	1	1
Swallows		*178*	*520*	*107*	*711*	*285*	*1,231*
bank swallow	*Riparia riparia*	2	3	0	0	2	3
barn swallow	*Hirundo rustica*	112	321	28	87	140	408
cliff swallow	*Petrochelidon pyrrhonota*	12	42	25	138	37	180
northern rough-winged swallow	*Stelgidopteryx serripennis*	12	26	4	17	16	43
tree swallow	*Tachycineta bicolor*	18	72	21	120	39	192
unidentified swallow		14	33	26	341	40	374
violet-green swallow	*Tachycineta thalassina*	8	23	3	8	11	31
Tanagers		*7*	*8*	*0*	*0*	*7*	*8*
lazuli bunting	*Passerina amoena*	4	4	0	0	4	4
painted bunting	*Passerina ciris*	1	1	0	0	1	1
western tanager	*Piranga ludoviciana*	2	3	0	0	2	3
Grosbeaks		*2*	*2*	*0*	*0*	*2*	*2*
black-headed grosbeak	*Pheucticus melanocephalus*	1	1	0	0	1	1
blue grosbeak	*Guiraca caerulea*	1	1	0	0	1	1
Shrikes		*152*	*159*	*69*	*83*	*221*	*242*
loggerhead shrike	*Lanius ludovicianus*	152	159	69	83	221	242
Thrushes		*2*	*2*	*8*	*10*	*10*	*12*
hermit thrush	*Catharus guttatus*	1	1	6	6	7	7
unidentified thrush		1	1	2	4	3	5

Appendix D1. Total number of groups and individuals for each bird type and species during small bird count surveys at the Palen Photovoltaic Solar Project[a], August 19 – November 14, 2013, and March 25 – June 4, 2014.

Bird Type / Species	Scientific Name	Fall 2013 # grps	Fall 2013 # obs	Spring 2014 # grps	Spring 2014 # obs	Overall # grps	Overall # obs
Titmice/Chickadees		*219*	*242*	*89*	*105*	*308*	*347*
verdin	*Auriparus flaviceps*	219	242	89	105	308	347
Vireos		*2*	*2*	*5*	*6*	*7*	*8*
Bell's vireo	*Vireo bellii*	1	1	0	0	1	1
Cassin's vireo	*Vireo cassinii*	1	1	0	0	1	1
warbling vireo	*Vireo gilvus*	0	0	5	6	5	6
Warblers		*269*	*553*	*49*	*74*	*318*	*627*
black-throated gray warbler	*Setophaga nigrescens*	1	1	1	2	2	3
common yellowthroat	*Geothlypis trichas*	10	10	1	1	11	11
Lucy's warbler	*Oreothlypis luciae*	0	0	2	2	2	2
MacGillivray's warbler	*Geothlypis tolmiei*	4	4	2	2	6	6
Nashville warbler	*Oreothlypis ruficapilla*	1	1	1	1	2	2
orange-crowned warbler	*Oreothlypis celata*	15	20	6	8	21	28
Townsend's warbler	*Setophaga townsendi*	0	0	2	2	2	2
unidentified warbler		2	2	4	6	6	8
Wilson's warbler	*Cardellina pusilla*	13	14	14	29	27	43
yellow-breasted chat	*Icteria virens*	1	1	0	0	1	1
yellow-rumped warbler	*Setophaga coronata*	216	493	16	21	232	514
yellow warbler	*Setophaga petechia*	6	7	0	0	6	7
Waxwings		*5*	*5*	*0*	*0*	*5*	*5*
phainopepla	*Phainopepla nitens*	5	5	0	0	5	5
Wrens		*40*	*53*	*13*	*13*	*53*	*66*
Bewick's wren	*Thryomanes bewickii*	3	3	0	0	3	3
cactus wren	*Campylorhynchus brunneicapillus*	31	44	13	13	44	57
house wren	*Troglodytes aedon*	2	2	0	0	2	2
rock wren	*Salpinctes obsoletus*	4	4	0	0	4	4
Unidentified Passerines		*40*	*71*	*10*	*14*	*50*	*85*
unidentified passerine		40	71	10	14	50	85
Swifts/Hummingbirds		**6**	**9**	**14**	**18**	**20**	**27**
Anna's hummingbird	*Calypte anna*	0	0	2	2	2	2
black-chinned hummingbird	*Archilochus alexandri*	0	0	1	1	1	1
unidentified hummingbird		0	0	7	7	7	7
Vaux's swift	*Chaetura vauxi*	6	9	3	6	9	15
white-throated swift	*Aeronautes saxatalis*	0	0	1	2	1	2
Woodpeckers		36	42	2	2	38	44
Gila woodpecker	*Melanerpes uropygialis*	**1**	**1**	**0**	**0**	**1**	**1**
ladder-backed woodpecker	*Picoides scalaris*	1	1	0	0	1	1
northern flicker	*Colaptes auratus*	34	40	2	2	36	42
Unidentified Birds		**3**	**4**	**3**	**33**	**6**	**37**
Unidentified small bird		3	4	2	26	5	30
unidentified large bird		0	0	1	7	1	7
Overall		**3,100**	**10,072**	**991**	**2,147**	**4,091**	**12,219**

[a] Regardless of distance from observer

Appendix E. All Bird Types and Species Observed at the Palen Photovoltaic Solar Project during Bird Use Count Surveys, March 9 – June 5, 2015

Appendix E1. Summary of the number of observations and groups recorded by species and bird type during spring bird use count surveys at the Palen Photovoltaic Solar Projecta, March 9 – June 5, 2015.

Type / Species	Scientific Name	# grps	# obs
Shorebirds		**1**	**1**
unidentified shorebird		1	1
Diurnal Raptors		**112**	**128**
Buteos		*67*	*81*
red-tailed hawk	*Buteo jamaicensis*	50	61
Swainson's hawk	*Buteo swainsoni*	15	18
unidentified buteo	*Buteo spp*	2	2
Northern Harrier		*3*	*3*
northern harrier	*Circus cyaneus*	3	3
Falcons		*34*	*34*
American kestrel	*Falco sparverius*	14	14
merlin	*Falco columbarius*	1	1
prairie falcon	*Falco mexicanus*	17	17
unidentified falcon	*Falco spp*	2	2
Osprey		*2*	*2*
osprey	*Pandion haliaetus*	2	2
Other Raptors		*6*	*8*
unidentified hawk		1	2
unidentified raptor		5	6
Owls		**1**	**1**
burrowing owl	*Athene cunicularia*	1	1
Vultures		**413**	**1,924**
turkey vulture	*Cathartes aura*	413	1,924
Doves/Pigeons		**2**	**3**
Eurasian collared-dove	*Streptopelia decaocto*	1	1
mourning dove	*Zenaida macroura*	1	2
Passerines		**103**	**233**
barn swallow	*Hirundo rustica*	31	75
cliff swallow	*Petrochelidon pyrrhonota*	10	43
common raven	*Corvus corax*	17	17
loggerhead shrike	*Lanius ludovicianus*	1	1
tree swallow	*Tachycineta bicolor*	14	44
unidentified swallow		28	51
western kingbird	*Tyrannus verticalis*	1	1
Wilson's warbler	*Cardellina pusilla*	1	1
Swifts/Hummingbirds		**7**	**11**
rufous hummingbird	*Selasphorus rufus*	1	1
unidentified swift		1	1
Vaux's swift	*Chaetura vauxi*	5	9
Unidentified Birds		**1**	**29**
unidentified bird (small)		1	29
Overall		**640**	**2,330**

[a] Within an unlimited viewshed

Appendix F. All Bird Types and Species Observed at the Palen Photovoltaic Solar Project during Shorebird/Waterfowl Surveys, March 13 – June 3, 2015

Appendix F1. Total number of groups and individuals for each bird type and species during spring shorebird/waterfowl surveys at the Palen Photovoltaic Solar Projecta, March 13 – June 3, 2015.

Bird Type / Species	Scientific Name	# grps	# obs
Waterbirds		**13**	**89**
double-crested cormorant	*Phalacrocorax auritus*	1	1
great blue heron	*Ardea herodias*	4	4
great egret	*Ardea alba*	1	3
green heron	*Butorides virescens*	1	1
snowy egret	*Egretta thula*	2	2
white-faced ibis	*Plegadis chihi*	4	78
Waterfowl		**17**	**49**
bufflehead	*Bucephala albeola*	2	2
cinnamon teal	*Anas cyanoptera*	3	12
green-winged teal	*Anas crecca*	1	1
mallard	*Anas platyrhynchos*	3	4
Mexican duck	*Anas diuzi*	1	1
redhead	*Aythya americana*	1	2
ring-necked duck	*Aythya collaris*	1	10
ruddy duck	*Oxyura jamaicensis*	5	17
Shorebirds		**65**	**321**
American avocet	*Recurvirostra americana*	2	100
black-necked stilt	*Himantopus mexicanus*	2	8
greater yellowlegs	*Tringa melanoleuca*	8	8
killdeer	*Charadrius vociferus*	12	41
least sandpiper	*Calidris minutilla*	7	46
long-billed curlew	*Numenius americanus*	2	9
long-billed dowitcher	*Limnodromus scholopaceus*	4	8
semipalmated plover	*Charadrius semipalmatus*	2	3
snowy plover	*Charadrius nivosus*	2	4
spotted sandpiper	*Actitis macularia*	6	41
western sandpiper	*Calidris mauri*	9	36
willet	*Tringa semipalmata*	1	1
Wilson's phalarope	*Phalaropus tricolor*	5	13
Wilson's snipe	*Gallinago delicata*	3	3
Gulls/Terns		**5**	**6**
California gull	*Larus californicus*	1	1
Forster's tern	*Sterna forsteri*	1	1
ring-billed gull	*Larus delawarensis*	3	4
Rails/Coots		**8**	**19**
American coot	*Fulica americana*	8	19
Diurnal Raptors		**44**	**46**
Buteos		*28*	*30*
ferruginous hawk	*Buteo regalis*	2	2
red-tailed hawk	*Buteo jamaicensis*	23	25
Swainson's hawk	*Buteo swainsoni*	3	3
Northern Harrier		*3*	*3*
northern harrier	*Circus cyaneus*	3	3
Falcons		*12*	*12*
American kestrel	*Falco sparverius*	3	3
peregrine falcon	*Falco peregrinus*	2	2
prairie falcon	*Falco mexicanus*	6	6
unidentified falcon	*Falco spp*	1	1
Osprey		*1*	*1*
osprey	*Pandion haliaetus*	1	1

Appendix F1. Total number of groups and individuals for each bird type and species during spring shorebird/waterfowl surveys at the Palen Photovoltaic Solar Project[a], March 13 – June 3, 2015.

Bird Type / Species	Scientific Name	# grps	# obs
Vultures		**63**	**861**
turkey vulture	*Cathartes aura*	63	861
Passerines		**112**	**554**
bank swallow	*Riparia riparia*	1	1
barn swallow	*Hirundo rustica*	30	70
cliff swallow	*Petrochelidon pyrrhonota*	24	163
northern rough-winged swallow	*Stelgidopteryx serripennis*	11	19
tree swallow	*Tachycineta bicolor*	29	245
unidentified swallow		10	42
violet-green swallow	*Tachycineta thalassina*	3	9
white-crowned sparrow	*Zonotrichia leucophrys*	1	1
yellow-headed blackbird	*Xanthocephalus xanthocephalus*	1	1
yellow-rumped warbler	*Setophaga coronata*	1	2
yellow warbler	*Setophaga petechia*	1	1
Goatsuckers		**1**	**3**
lesser nighthawk	*Chordeiles acutipennis*	1	3
Swifts/Hummingbirds		**9**	**9**
white-throated swift	*Aeronautes saxatalis*	9	9
Kingfishers		**1**	**1**
belted kingfisher	*Ceryle alcyon*	1	1
Overall		**338**	**1,958**

[a] Regardless of distance from observer

Appendix G. All Bird Types and Species Observed at the Palen Photovoltaic Solar Project during Small Bird Count Surveys, March 16 – June 5, 2015

Appendix G1. Total number of groups and individuals for each bird type and species during spring small bird count surveys at the Palen Photovoltaic Solar Project[a], March 16 – June 5, 2015.

Bird Type / Species	Scientific Name	# grps	# obs
Waterbirds		**2**	**8**
cattle egret	*Bubulcus ibis*	1	1
white-faced ibis	*Plegadis chihi*	1	7
Waterfowl		**4**	**19**
bufflehead	*Bucephala albeola*	1	1
cinnamon teal	*Anas cyanoptera*	1	3
ruddy duck	*Oxyura jamaicensis*	1	9
unidentified duck		1	6
Shorebirds		**12**	**37**
American avocet	*Recurvirostra americana*	1	17
killdeer	*Charadrius vociferus*	4	7
least sandpiper	*Calidris minutilla*	2	6
long-billed dowitcher	*Limnodromus scholopaceus*	1	2
marbled godwit	*Limosa fedoa*	1	2
solitary sandpiper	*Tringa solitaria*	1	1
spotted sandpiper	*Actitis macularia*	1	1
willet	*Tringa semipalmata*	1	1
Rails/Coots		**2**	**7**
American coot	*Fulica americana*	2	7
Diurnal Raptors		**30**	**30**
American kestrel	*Falco sparverius*	5	5
Cooper's hawk	*Accipiter cooperii*	1	1
ferruginous hawk	*Buteo regalis*	1	1
northern harrier	*Circus cyaneus*	3	3
osprey	*Pandion haliaetus*	1	1
prairie falcon	*Falco mexicanus*	4	4
red-tailed hawk	*Buteo jamaicensis*	11	11
Swainson's hawk	*Buteo swainsoni*	3	3
unidentified raptor		1	1
Vultures		**126**	**494**
turkey vulture	*Cathartes aura*	126	494
Upland Game Birds		**9**	**18**
Gambel's quail	*Callipepla gambelii*	9	18
Doves/Pigeons		**84**	**132**
Eurasian collared-dove	*Streptopelia decaocto*	6	16
mourning dove	*Zenaida macroura*	71	107
white-winged dove	*Zenaida asiatica*	7	9
Passerines		**534**	**886**
<u>*Corvids*</u>		*81*	*156*
common raven	*Corvus corax*	81	156
<u>*Blackbirds/Orioles*</u>		*22*	*52*
Brewer's blackbird	*Euphagus cyanocephalus*	2	3
brown-headed cowbird	*Molothrus ater*	1	12
European starling	*Sturnus vulgaris*	5	14
great-tailed grackle	*Quiscalus mexicanus*	12	20
red-winged blackbird	*Agelaius phoeniceus*	1	1
yellow-headed blackbird	*Xanthocephalus xanthocephalus*	1	2
<u>*Finches/Crossbills*</u>		*51*	*79*
house finch	*Haemorhous mexicanus*	51	79

Appendix G1. Total number of groups and individuals for each bird type and species during spring small bird count surveys at the Palen Photovoltaic Solar Project[a], March 16 – June 5, 2015.

Bird Type / Species	Scientific Name	# grps	# obs
Flycatchers		*37*	*41*
ash-throated flycatcher	*Myiarchus cinerascens*	13	13
black phoebe	*Sayornis nigricans*	5	6
olive-sided flycatcher	*Contopus cooperi*	1	1
Pacific-slope flycatcher	*Empidonax difficilis*	2	2
Say's phoebe	*Sayornis saya*	10	12
unidentified flycatcher	*NA*	1	1
western kingbird	*Tyrannus verticalis*	5	6
Gnatcatchers/Kinglet		*24*	*29*
black-capped gnatcatcher	*Polioptila nigriceps*	1	1
black-tailed gnatcatcher	*Polioptila melanura*	22	27
ruby-crowned kinglet	*Regulus calendula*	1	1
Grassland/Sparrows		*61*	*81*
Brewer's sparrow	*Spizella breweri*	2	4
horned lark	*Eremophila alpestris*	56	72
house sparrow	*Passer domesticus*	1	1
unidentified sparrow		1	3
white-crowned sparrow	*Zonotrichia leucophrys*	1	1
Mimids		*10*	*11*
Le Conte's thrasher	*Toxostoma lecontei*	8	9
northern mockingbird	*Mimus polyglottos*	2	2
Swallows		*74*	*232*
barn swallow	*Hirundo rustica*	29	66
cliff swallow	*Petrochelidon pyrrhonota*	11	48
tree swallow	*Tachycineta bicolor*	15	54
unidentified swallow		17	59
violet-green swallow	*Tachycineta thalassina*	2	5
Tanagers		*1*	*1*
western tanager	*Piranga ludoviciana*	1	1
Grosbeaks		*1*	*1*
rose-breasted grosbeak	*Pheucticus ludovicianus*	1	1
Shrikes		*41*	*48*
loggerhead shrike	*Lanius ludovicianus*	41	48
Titmice/Chickadees		*102*	*121*
verdin	*Auriparus flaviceps*	102	121
Vireos		*2*	*2*
warbling vireo	*Vireo gilvus*	2	2
Warblers		*19*	*24*
MacGillivray's warbler	*Geothlypis tolmiei*	1	1
orange-crowned warbler	*Oreothlypis celata*	3	4
unidentified warbler		3	4
Wilson's warbler	*Cardellina pusilla*	9	12
yellow-rumped warbler	*Setophaga coronata*	3	3
Waxwings		*4*	*4*
phainopepla	*Phainopepla nitens*	4	4
Wrens		*4*	*4*
cactus wren	*Campylorhynchus brunneicapillus*	2	2
house wren	*Troglodytes aedon*	1	1
unidentified wren		1	1
Cuckoos		**8**	**8**
greater roadrunner	*Geococcyx californianus*	8	8

Appendix G1. Total number of groups and individuals for each bird type and species during spring small bird count surveys at the Palen Photovoltaic Solar Project[a], March 16 – June 5, 2015.

Bird Type / Species	Scientific Name	# grps	# obs
Goatsuckers		**5**	**8**
lesser nighthawk	*Chordeiles acutipennis*	5	8
Swifts/Hummingbirds		**9**	**9**
black-chinned hummingbird	*Archilochus alexandri*	4	4
Costa's hummingbird	*Calypte costae*	3	3
unidentified hummingbird		2	2
Kingfishers		**1**	**1**
belted kingfisher	*Ceryle alcyon*	1	1
Unidentified Birds		**31**	**59**
unidentified bird (small)		31	59
Overall		**857**	**1,716**

[a] Regardless of distance from observer

Appendix H. Wildlife Incident Reporting System (WIRS) Example Data Sheet

PALEN SOLAR PHOTOVOLTAIC PROJECT WILDLIFE INCIDENT REPORTING

The following procedures are to be followed when Palen personnel or subcontractors discover a wildlife fatality or injury while on site. These procedures are intended to be in place for the life of the project and are independent of the post-construction monitoring studies. Prior to the initiation of operations, on-site training will be provided to Palen personnel and subcontractors regarding the implementation of this WIRS.

When To Use The WIRS - What Constitutes A Reportable Incident?

For the purposes of this reporting system, *incident* is a general term that refers to any wildlife species, or evidence thereof, that is found dead or injured within the wind project. Note that an incident may include an injured animal and does not necessarily refer only to a carcass or fatality.

An intact carcass, carcass parts, bones, scattered feathers, or an injured wildlife species all represent reportable incidents. Palen personnel and subcontractors shall report all such discoveries even if you are uncertain if the carcass or parts are associated with the facility.

A ***fatality*** is any find where death occurred, such as a carcass, carcass parts, bones, or feather spot. To be considered a feather spot, the detection must include at least five tail feathers or two primary flight feathers within five m or less of each other, or a total of 10 feathers concentrated together in an area of three square m (1 m^2; 32 square ft [ft2]).

An ***injury*** or injured animal is any wildlife species with an apparent injury, or that exhibits signs of distress to the point where it cannot move under normal means or does not display normal escape or defense behavior.

Prior to assuming a wildlife species is injured, it should be observed to determine if it cannot or does not display normal behaviors. For example, raptors will occasionally walk on the ground, especially if they have captured a prey item. Raptors also "mantle" or hold their wings out and down to cover a prey item. These types of behaviors may make the wings appear broken or the animal injured. Identification of specific behaviors typical to the life cycles and distress behaviors of wildlife will be part of the Palen wildlife training program. Always exercise caution before approaching an injured wildlife species. **Under no circumstances are site personnel that are not included in the SPUT permit allowed to handle carcasses or injured animals.**

Note: *Any incident involving a federally or state listed threatened or endangered species, bald eagle, or golden eagle must be reported to USFWS and/or California Department of Fish and Wildlife (CDFW) within 24 hours of identification. See project personnel listing for contact information.*

MATERIALS NEEDED TO REPORT AN INCIDENT

1. A copy of this WIRS
2. A Wildlife Incident Report Form (see below)
3. Project Personnel Listing and Contact Information
4. Pencil, Pen
5. Camera
6. Flagging

PALEN SOLAR PHOTOVOLTAIC PROJECT WILDLIFE INCIDENT REPORTING PROCEDURES

The following procedures apply if the incident involves a **Wildlife Fatality** or **Injured Wildlife Species**:

- **Leave the subject animal in place**. A flag may be used to mark its location for easy finding while the data sheet is being completed. It is recommended that any flagging be marked with the date, time, and initials of the recorder. **DO NOT HANDLE THE CARCASS.**

- **Report** the find to the Site Operations Manager immediately.

- The Site Operations Manager shall complete the following steps:

    - **Photograph** the incident as it was found in the field. Take at least two pictures: a close up shot of the animal as it lays in the field and a broader view of the animal (marked by a flag) with the road, turbines, or other local features in the view. For the close up picture, place an object (e.g., radio, pencil, coin, etc.) next to the carcass for a scale of size.

    - **Prepare a Wildlife Incident Report Form.** The form and associated instructions are presented below.

    - **Report** the find to Palen's Environmental Department.

The following procedures apply if the incident involves an **Injured Wildlife Species**:

- **Move** to a distance far enough away that it is not visibly disturbed or uneasy due to your presence. **DO NOT ATTEMPT TO CAPTURE OR HANDLE AN INJURED ANIMAL.**

- **Report** the find immediately to the Operations Site Manager

- The Site Operations Manager shall complete the following steps:

    - **Report** the find to the Environmental Affairs Lead immediately.

- **Contact** a local rehabilitation center (*see contact list in section 5.3*) for further instructions on handling and transport/pickup of the injured animal.

- **Prepare a Wildlife Incident Report Form.** The form and instructions for filling out the form are provided below.

*** Any incident involving a federally or state listed threatened or endangered species or a bald or golden eagle must be reported to the USFWS and/or CDFW within 24 hours of identification. These incidents will be reported to the agency verbally by the Operations Manager or Palen's Environmental Department.**

PALEN SOLAR PHOTOVOLTAIC
WILDLIFE INCIDENT REPORTING FORM

INCIDENT DETAILS

Project Location/Name:

Name of Observer/s:__________________ Date: __________ Time: ______

Type of Incident: ☐ Injury ☐ Fatality

Carcass Condition: ☐ Intact Carcass ☐ Partial Carcass ☐ Feathers Only

Age of Remains (days): ☐ 1-2 (fluid filled eyes) ☐ 2-4 (maggots) ☐ 5+ (dried bones/feathers)

Photos Taken: ☐ Yes ☐ No (Take photos of - Birds: beak, legs, feathers, body. Wildlife: face and ears, tail and feet, body)

Who was notified of incident? (see contact list below)______________________________

Comments on Carcass Condition or Behavior of Injured Animal:________

____

____

____

LOCATION

Where Found: ☐ On Access Road ☐ Solar Array ☐ Under Power Line ☐ Substation

GPS Coordinates: UTM N: UTM E:

DATUM:__________

Comments on Location:____

____

____

IDENTIFICATION

☐ Bird ☐ Bat ☐ Mammal ☐ Other:______________________

Species (to best of ability):____

Description of Color/Markings:____

Does Animal Resemble a Species of Concern discussed at Training? ☐ Yes ☐ No

Identification Remarks:____

____

____

(Describe details of - Birds: beak size, color, and shape; leg size, color, and shape; feather color; body size. Bats: color of fur and wings; muzzle long or short, tail attached or extending; ear color and shape); Other Wildlife: color of fur, any markings, and body size.

____

____

ENVIRONMENTAL CONDITIONS

Weather (Check all that apply): ☐ Clear ☐ Cloudy ☐ Rain ☐ Dust Storm

Approximate Temperature (F°):__________

Wind: ☐ Calm ☐ Breezy/Gusty ☐ Strong Winds

Habitat where found: ☐ Gravel (access road/turbine pad) ☐ Bare Ground ☐ Wash ☐ Desert scrub

OTHER NOTES/COMMENTS:____

CONTACT LIST (Immediately notify one of these individuals of incident)

1. Operations Manager:

2. Environmental Affairs Lead:

Appendix I. Technical Memorandum: Understanding Potential Risk, and Patterns of Avian Fatalities from Utility-Scale Photovoltaic Solar Facilities

TECHNICAL MEMORANDUM

Date: January 23, 2017

To: Javier De La Garza
EDF Renewable Energy

From: Karl Kosciuch, Daniel Riser-Espinoza, Wally Erickson; WEST, Inc.

Subject: Understanding potential risk, and patterns of avian fatalities from utility-scale photovoltaic solar facilities

INTRODUCTION

Palen Solar III, LLC, a wholly owned subsidiary of EDF Renewable Energy (EDF RE), is developing the Palen Solar Photovoltaic (PV) Project (Project), which consists of single axis PV panel arrays with a net capacity of 500 megawatts (MW). The proposed Project will occupy approximately 4,200 acres (17.0 square kilometers [km^2]) of Bureau of Land Management (BLM)-administered land in Riverside County, California (Figure 1.1). The name Palen was applied to an earlier project called the Palen Solar Power Project (PSPP) that proposed developing the site with a parabolic trough solar thermal facility. The site was subsequently re-evaluated for a solar thermal energy generating project (power tower) called the Palen Solar Electric Generating System (PSEGS). Unlike the current Project, both earlier proposals were regulated by the California Energy Commission (CEC). The BLM prepared a Final Environmental Impact Statement (EIS) for the PSPP in 2011 after the CEC completed a Final Staff Assessment and approved the PSPP in 2010. The CEC prepared a new Staff Assessment and the BLM prepared a Draft Supplemental EIS for PSEGS in 2013; however, the CEC never approved the PSEGS and the BLM never issued a Final Supplemental EIS because the project proponent withdrew the PSEGS from the permitting process. Although the name Palen is consistent across projects, the use of technology has changed along with the potential risks to birds, as the project is now a solar PV facility rather than solar trough or power tower.

The purpose of this technical memorandum is to support and update the Supplemental EIS for the Project with the most current information related to the "lake effect" hypothesis, and describe the patterns in mortality risk for avian and bat species posed by utility-scale PV solar facilities based on currently available monitoring data. At least three studies with a full year of data collected at PV solar facilities have been completed since the Draft Supplemental EIS for the PSEGS project was prepared. Furthermore, the Draft Supplemental EIS was written with respect to a different utility-scale solar technology (power tower) with different known and potential risks to avian and bat species. This document will address the hypothesized causal mechanism for avian risk posed by PV solar facilities known as the lake effect hypothesis, discuss the data (or lack thereof) to support the hypothesis, describe the studies and results of

available standardized monitoring data at PV solar facilities, and provide conclusions that can be drawn from available data in the context of the lake effect hypothesis.

LAKE EFFECT HYPOTHESIS

Origin of the Lake Effect Hypothesis

The distinct origin of the lake effect hypothesis is difficult to pinpoint as it could have been discussed in various contexts (e.g., wildlife agency meetings, public scoping meetings) without being documented. However, one of the earlier documents to formalize the idea that solar energy facilities could be interpreted by birds as a water body was a report (hereafter, "forensics report") prepared by the staff of the National Fish and Wildlife Forensics Laboratory (Kagan et al. 2014). Bird species that are water-dependent and cannot easily walk on land, including American coot (*Fulica americana*), pied-billed grebe (*Podilymbus podiceps*), eared grebe (*Podiceps nigricollis*), western grebe (*Aechmophorus occidentalis*), and double-crested cormorant (*Phalacrocorax auritus*), were found as fatalities at solar energy facilities leading Kagan et al. (2014, p. 11) to state:

> *This suggests a link between predation and stranding and/or impact resulting from confusion of the solar panels with water (see Discussion).*

And to further suggest on p. 16 of the forensic report:

> *A desert environment punctuated by a large expanse of reflective, blue panels may be reminiscent of a large body of water.*

The forensics report is regarded as formalizing the idea that solar panels could be mistaken as water by birds, but in some cases the lake effect is assumed to be evident. Scientific American reported on the forensics report (Scientific American 2014) and incorrectly interpreted the suggestion by Kagan et al. (2014) as fact of a lake effect:

> *Much of the problem appears to lie in the "lake effect," in which birds and their insect prey can mistake a reflective solar facility for a water body, or spot water ponds at the site, then hone in on it. Because of the power of the lake effect, the federal investigators described such solar farms as "mega-traps" in their report.*

The forensics report was an examination of bird carcasses, and not an ecological study or bird behavior study, and the Scientific American article misinterprets the findings of the forensics report.

The forensics report did not define the hypothesis, but suggested that birds could mistake solar energy facilities for water. In a review of bird monitoring studies at solar energy facilities, Walston et al. (2015) defined the lake effect hypothesis as (p. A-2):

> *Lake Effect Hypothesis – The hypothesis that water-dependent bird species may potentially mistake the extensive solar arrays for water features on which the*

birds can land, usually at night. Such collisions, often do not result in direct mortality, but the birds sometimes cannot take off after collisions because they are adapted to take off from water, not dry land.

Refinement and Application of the Lake Effect Hypothesis

Though Kagan et al. (2014) and Walston et al. (2015) did not hypothesize a casual mechanism; work by Horváth et al. (2009, 2010) has been invoked to provide specificity in the lake effect hypothesis. Horváth et al. (2009) introduced the term polarized light pollution (PLP) to describe the presence of polarized light from artificial surfaces that could alter patterns experienced by organisms in a natural system. Horváth et al. (2009) have been cited as hypothesizing that the lake effect is attributable to PLP (Huso et al. 2016). The only mention of solar panels by Horváth et al. (2009) is a statement that solar panels are a possible source of polarized light pollution.

> *For example, photovoltaic solar panels are a possible source of PLP (Figure 6a), and production of these is predicted to increase in response to rising energy prices.*

In a draft discussion document for the preparation of bird and bat conservation strategies for solar energy projects, the USFWS (2016) states (p. 12):

> *For example, projects should consider alternative configurations for the project to reduce the potential that the project would present the illusion of a large water body (i.e., "lake effect"). This might include increased spacing between panels or mirrors to minimize visual overlap. Similarly, the use of single and dual axis tracking panels or mirrors could allow panels to be offset to break-up any lake effect, particularly during storage at night.*

The USFWS (2016) suggests design features for solar energy facilities based on an interpretation of the causal mechanism that the solar energy project represents an illusion to birds. However, no studies exist to demonstrate that bird perceive an illusion of a lake when approaching a solar energy facility.

Summary of Lake Effect Hypothesis

The presence of water-associated bird species fatalities at solar energy facilities has led some scientists to suggest that these species might interpret solar facilities as water (Kagan et al. 2014, Walston et al. 2015, Huso et al. 2016). Thus, the lake effect hypothesis was developed based on the idea that water-associated bird species that cannot walk easily on land should not occur at a solar facility and arrived at the facility by mistake. How water-associated birds see and respond to solar energy facilities is poorly understood; thus, the mechanism responsible for the presence of water-associated birds at solar facilities is unknown. Because aspects of water-associated bird biology (such as how they perceive polarized light) are poorly understood, the lake effect hypothesis cannot be used to predict if water-associated bird fatalities would occur at a proposed solar energy project. More, if water-associated bird fatalities were detected, the number of additional fatalities could not be predicted with precision from the fatalities

documented. Further, understanding water-associated bird vision alone is unlikely to predict whether or not fatalities would occur, and other environmental factors, such as proximity of a proposed project to water or a proposed project's location in a water-associated bird migratory pathway, likely have influence on fatality risk.

Understanding the causal mechanism is essential to determining if the lake effect hypothesis is viable, but understanding the casual mechanism is not essential to estimating bird fatalities at solar energy facilities. Regardless of the mechanism, fatalities occurred, and with a robust sampling design and statistical methods, a fatality estimate can be calculated. Fatality estimates and variability in the estimates can be reviewed among sites to understand the patterns of occurrence of waterbirds to draw inference regarding the prevalence of waterbirds at solar energy projects. Thus, it is important to separate inference regarding the mechanism responsible for the presence of waterbirds at solar energy facilities (i.e., lake effect) and the fatality estimates for waterbirds and the potential effects to populations.

Additional Study

The lake effect hypothesis should be refined and causal mechanisms more carefully considered. Recently, the CEC released Grant Funding Opportunity CEC GFO-16-306 (CEC 2016) that contained an opportunity for "Investigating the Impacts of "Lake Effect" from Solar Energy-Generating Facilities on Avian Behavior". A proposed study could include experiments to evaluate how birds respond to solar panels, and field studies to understand the landscape and local responses of birds to solar energy facilities. Thus, if a proposal is funded, a study could provide an understanding of how birds perceive solar energy facilities and if there is actually a lake effect.

SUMMARY OF PUBLICLY AVAILABLE FATALITY MONITORING STUDIES

Overview

Currently, there are only three publicly available studies from utility-scale solar facilities with data collected under standardized monitoring protocols for at least one year: California Valley Solar Ranch (CVSR; H. T. Harvey and Associates 2014), Topaz (Althouse and Meade 2014), and Desert Sunlight (DSL; WEST 2016). CVSR and Topaz are located in San Luis Obispo County, California, and have rated capacities of 250 and 550 MW, respectively; DSL is located in Riverside County, California, and has a rated capacity of 550 MW. Prior to 2016, CVSR and Topaz were only two PV solar facilities with at least one year of publicly available, standardized avian fatality monitoring data. Both of these projects are located in a predominantly agricultural and grassland setting. In contrast, the DSL project is located in a desert environment.

The occurrence of different species and species groups of birds are of interest at PV solar projects. Two species guilds are often discussed: waterbirds (or water-associated birds), and non-water-associated birds. Water-associated birds of interest include American coot, loons, grebes, and some waterfowl and geese. The occurrence of water-associated bird species led to the development of the lake effect hypothesis previously discussed. All other bird species,

including diverse groups such as raptors, hummingbirds, and songbirds, are referred to as non-water-associated birds. The terms waterbirds or water-associated birds and non-water-associated birds are used throughout.

As discussed below, results from the three available monitoring studies in California suggest that direct impacts to birds are relatively low compared to other sources of anthropogenic avian mortality, including (but not limited to) wind turbines, tall buildings, communication towers, annual harvests, and domestic cats (*Felis catus*; Klem 2009; Calvert et al. 2013; Longcore et al. 2013; Loss et al. 2013a, 2013b, 2014; Erickson et al. 2014). For example, annual harvest of water-associated game birds in Canada was estimated to be almost 1.7 million, while approximately 50,000 annual water-associated bird fatalities were estimated for medium and high-rise buildings (Calvert et al. 2013). Furthermore, data from the three publicly available standardized monitoring studies suggest water-associated bird mortality is not ubiquitous at PV solar facilities, is generally lower in magnitude than other bird groups, and may be site specific (Althouse and Meade 2014; H. T. Harvey and Associates 2014; WEST 2016). Water-associated bird fatalities were discovered among energized arrays only at DSL (Althouse and Meade 2014; H. T. Harvey and Associates 2014; WEST 2016). Unlike CVSR and Topaz, which are located in landscape dominated by grassland and agriculture and with water resources nearby, DSL is located in a desert habitat with relatively few water resources in close proximity to the site. The nearest sources of water are an aquaculture facility (three kilometers [two miles]) and a small lake complex in the community of Lake Tamarisk (6.4 kilometers [4.0 miles]; WEST 2014a). At this time it is not known if surrounding habitat (e.g., grass land versus desert), proximity to water bodies, or the size and quality of nearby waterbodies (if they exist) is correlated with water-associated bird mortality at PV solar facilities in a statistically meaningful way.

PV solar projects pose little mortality risk to bats, particularly among PV arrays, based on the data collected to date. For example, no bat fatalities were reported during the first year of standardized monitoring at DSL; three bats were discovered incidentally within the facility prior to initiation of operations, and all three were associated with buildings or fences (WEST 2014b, 2016). No bats were discovered during monitoring at CVSR (H. T. Harvey and Associates 2014). A single bat was detected[1] incidentally at Topaz; however, it was discovered upon opening a shipping container for the first time and was identified as a non-native species, and thus was not attributable to the Topaz project (Althouse and Meade 2014).

Across all three projects with publicly available monitoring data, non-water-associated birds made up the largest percentage of detections among arrays (303 of 358 detections, or 85% of detections). The majority of non-water-associated bird detections among arrays has been passerines, doves, and pigeons (83%), and comprised 34 identifiable species. Only four raptors (two species) have been detected among the arrays at the three facilities, one each at DSL and Topaz, and three at CVSR. All 55 of the water-associated bird detections among completed

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[1] For clarity, the term "detection" will be used throughout to describe any discovery of any carcass, partial carcass, feather spot, or injured birds as part of a standardized search, or an incidental discovery.

arrays occurred at DSL, the only desert site among the three studies available. The 55 water-associated bird detections comprised 15 identifiable species. Thus, overall impacts to birds have been spread across a large number of species and do not appear to disproportionately affect any one species relative to their overall abundance.

Project Specific Data

During weekly post-construction monitoring at all elements (e.g., arrays, fences, overhead lines, references sites, and evaporation ponds) of CVSR, there were 368 detections. The most frequent bird type (taxonomic group) observed was passerines (56%), followed by doves and pigeons (30%). Only one water-associated bird detection was discovered (American coot) during the 12-month period analyzed, and it was found during standardized searches under the gen-tie line, away from solar arrays. The most frequently found individual species were mourning doves (*Zenaida macroura*; 30%), horned larks (*Eremophila alpestris*; 26%), house finches (*Haemorhous mexicanus*; 14%), and western meadowlarks (*Sturnella neglecta*; 7%). Overall, the majority of detections on regular weekly surveys occurred in the sampled arrays (approximately 55%).

At Topaz, 66 bird fatalities were detected during the 12-month monitoring period analyzed (41 during surveys, and 25 incidental), with carcasses found in construction areas (prior to operations), reference sites outside of the facility, energized arrays, energized power equipment, and linear features (e.g., fences and overhead lines). Six fatalities were domestic chickens (*Gallus gallus domesticus*) from adjacent private land, likely brought into the project by a canid and thus not attributable to the project (Althouse and Meade 2014). Passerines constituted the largest percentage (33%) of the 60 fatalities potentially attributable to the project, followed by corvids (22%) and doves/pigeons (20%). The most frequently found individual species were common ravens (*Corvus corax*; 22%), horned larks (20%), and mourning doves (12%). Only 7% (four detections) of the birds found were water-associated birds and they were found in construction areas, along a road, or in a water retention pond. Of the 41 detections found on regular surveys, 34% of birds were found among arrays, 64% within reference sites, and 2% were found under overhead lines.

The first year of standardized monitoring at DSL, which like the Project is situated in a desert habitat, was completed in February 2016 (WEST 2016); 149 avian detections were recorded. Water-associated birds were the most frequently discovered species guild within sampled arrays during standardized searches, with 36 detections (52%), followed by passerines with 16 (23%). The most common water-associated birds observed were grebes (36% of water-associated birds in the arrays, including western, eared [*Podiceps nigricollis*], and pied-bill grebe), American coot (16%), common loon (*Gavia immer*; 7%), ruddy duck (*Oxyura jamaicensis*; 5%) and sora (*Porzana carolina*; 5%).

The estimated density of carcasses for the DSL project components within the fence (solar arrays and fence) was approximately 0.19 carcasses/acre/year, or 1.05 fatalities/MW/year, which translates to an estimated 579 fatalities within the facility during the first year of monitoring. The estimates of water-associated birds and passerines were nearly the same for

the solar arrays (265 and 252 detections, respectively), with an estimated density of 0.08 birds/acre/year. Estimates for other groups (e.g., doves/pigeons, corvids, etc.) were generally fewer than 10 birds, with the exception of doves and pigeons (22 detections). In other words, despite finding more water-associated bird carcasses or feather spots, the estimated fatalities per acre, per year for water-associated birds was similar to the rates for passerines because most water-associated birds are large-bodied animals that persist for longer than small passerines, and are detected at high rates within the solar arrays compared to small songbirds. Also, more fatalities were estimated for the gen-tie line, which is a common feature on the landscape that is associated with all varieties of power infrastructure and not unique to solar facilities, than the solar arrays.

Background Mortality Studies

At CVSR and Topaz, background avian fatality monitoring was conducted in an effort to assess causation and determine if avian fatalities were likely the result of interactions with facility infrastructure (e.g., PV panels) or whether some of the fatalities might be unrelated to the presence of the facility. Based on background studies at CVSR and Topaz, bird mortality within both project sites was found to either not differ significantly from background mortality (H. T. Harvey and Associates 2014) or was measured greater in magnitude than facility related mortality (Althouse and Meade 2014). Furthermore, the species composition of birds found during background mortality studies was similar to the composition of species found among the arrays, and cause of death was generally not determinable or was suspected to be predation for fatalities found in either location. Thus, similar species were detected as fatalities inside and outside the facility, cause was not immediately attributable to collision with panels and was more often related to predation, and the number of fatalities detected outside the facility was either comparable or greater than that measured among the arrays. The results suggest the possibility that predation or other natural process are occurring at a high enough rate among the arrays that a significant number of fatalities from natural process are being detected on surveys that are intended to measure direct, facility related impacts. Put another way, the fatality rates that have been observed at the arrays of the CVSR and Topaz studies may not be different from what would be measured if the facilities had never been built and the same monitoring program had occurred; however, a note of caution is in order. Background avian mortality is naturally tied to avian use; if there are more birds in an area, there are more opportunities for bird fatalities, and thus bird carcasses or feather spots to be generated. An additional correlate is the predator activity and density within the same area. At this time, it is not known how avian use and predator use correlates with background mortality in a quantifiable way. Additionally, the background studies at these solar facilities were conducted adjacent to the projects (generally within one mile [1.6 kilometer] of the project boundary), and the researchers were not able to isolate the proportion of project-related fatalities that may have entered the reference sample. Avian use rates were not factored into the comparisons of background and array fatalities in either the CVSR or Topaz study, and thus those background studies must be interpreted with some caution. Assuming use rates are similar inside and outside of the facilities, it may be appropriate to conclude that fatality rates measured among the arrays is likely inflated by background mortality, and fatality rates from arrays may not be significantly different from background mortality.

Inferences from Monitoring Data and Connection to the Lake Effect Hypothesis

Data from three publicly available studies at PV solar facilities suggests that impacts to avian species are generally distributed across numerous species, typically passerines, doves, and pigeons, which are common birds with robust populations regionally and nationally. Furthermore, background mortality studies at two sites (CVSR and Topaz) suggest fatality rates in and outside of the facility may be comparable in some circumstances, and thus observed fatality estimates being attributed to the facility may be inflated by carcasses and feather spots occurring from natural processes. Most of the birds commonly detected among arrays at CVSR, Topaz, and DSL belong to species guilds which are naturally short lived and reproduce rapidly. Short-lived birds with high fecundity are generally resilient to adult mortality and are unlikely to experience biologically significant impacts at the local, regional, or national level, even accounting for multiple sources of anthropogenic avian mortality, such as wind turbines, communication towers, tall buildings, and feral and domestic cats (Stahl and Oli 2006, Erickson et al. 2014). The lack of bat fatalities discovered among arrays show there is no evidence to conclude PV arrays are a risk factor for bats in any setting. Thus, the results of fatality monitoring at three utility-scale PV solar facilities suggest that PV arrays do not pose a biologically significant threat to the avian populations most commonly detected among arrays, or any bat species at a local, regional, or national scale.

Water-associated bird fatalities were discovered at the DSL project; however, overall estimates of water-associated bird mortality did not differ significantly from estimates of non-water-associated bird mortality among arrays (WEST 2016). Thus, although more water-associated birds were detected during surveys, the estimated mortality is not higher than non-water associated birds for DSL. Similarly to the non-water-associated birds discovered at DSL, the water-associated bird fatalities were spread across several species, including American coot, common loon, western grebe, ruddy duck, sora, mallard (*Anas platyrhynchos)*, eared grebe, Virginia rail (*Rallus limicola*), northern shoveler (*A. clypeata*), northern pintail (*A. acuta*), cinnamon teal (*A. cyanoptera*), blue-winged teal (*A. discors*), pied billed grebe, least sandpiper (*Calidris minutilla*), and double-crested cormorant. Also of note, no water-associated bird fatalities were discovered at CVSR and Topaz. Thus, the data collected and analyzed to date suggest that impacts to water-associated birds are not ubiquitous at PV solar facilities, do not disproportionately affect one species, the incidence of water-associated bird mortality is similar to that of other species guilds, and overall impacts to water-associated birds are low in comparison to other sources of anthropogenic avian mortality (e.g., medium and high-rise buildings, permitted harvest, power lines, communication towers, and domestic and feral cats; Calvert et al. 2013).

The data are inconclusive with respect to supporting or refuting the lake effect hypothesis. As described above, the lake effect hypothesis was developed to explain a pattern observed in the data and has no predictive utility. Thus, water-associated bird fatalities that may occur at a future PV solar energy project cannot be predicted utilizing the lake effect hypothesis because it is a form of abductive reasoning. The presence of water-associated birds at DSL does not "support" the lake effect hypothesis; rather, it facilitates the same form of abductive reasoning:

water-associated birds were found at DSL, therefore these species mistake the solar facility for a lake. Similarly, the absence of water-associated birds at Topaz and CVSR does not lead to the rejection of the lake effect hypothesis. Thus, it is not possible at this time to determine if the conditions present at the Project would facilitate an attraction by water-associated birds based on either the lake effect hypothesis or the observed detection patterns at the three projects studied to date.

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Appendix C

Paleontological Resources Reports

Appendix C-1: Paleontological Resources Technical Report 2009

Appendix C-2: Paleontological Update 2013

Appendix C-1

Paleontological Resources
Technical Report 2009

APPENDIX C-1

Palen Solar Project

Originally Appendix H to the
PSPP Final EIR, August 2009

APPENDIX H

Paleontological Resources Technical Report

Paleontological Resources Assessment for the Palen Solar Power Project, Riverside County, California

Prepared for

AECOM Environment

On behalf of:

Solar Millennium, LLC

and

Chevron Energy Solutions

Prepared by

SWCA Environmental Consultants
Pasadena Office
July 2009

PALEONTOLOGICAL RESOURCES ASSESSMENT FOR THE PALEN SOLAR POWER PROJECT
RIVERSIDE COUNTY, CALIFORNIA

SWCA PROJECT NUMBER 15422

SUBMITTED TO:
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PROJECT SUMMARY

PURPOSE AND SCOPE

SWCA Environmental Consultants was retained by AECOM Environment to conduct paleontological resources management services for the Palen Solar Power Project (PSPP or Project) located north of Interstate 10 (I-10) approximately 10 miles east of Desert Center in Riverside County, California. Solar Millennium, LLC and Chevron Energy Solutions (Applicants) propose to develop a nominal 500 megawatt (MW) solar thermal electric generating facility on public lands managed by the Bureau of Land Management (BLM) and includes a privately owned 40-acre parcel (under purchase option by the Applicants). The PSPP comes under the jurisdiction of both the California Energy Commission (CEC) and BLM and the two agencies are conducting a joint review of the Project. The paleontological studies documented in this report are intended to support CEC compliance with the requirements of the California Environmental Quality Act (CEQA) and BLM's compliance with the National Environmental Policy Act (NEPA); a combined CEQA/NEPA document will be prepared jointly by the two agencies.

The Project will require a double circuit 230 kV transmission line to interconnect its electrical output with the regional transmission system, but the route of this transmission has not yet been finalized. For that reason no paleontological investigation of a transmission route for the PSPP has been performed yet. When the route is finalized, the necessary paleontological investigation and impact assessment will be performed and the results reported to the regulatory agencies and other stakeholders.

The paleontological resources scope of services included (1) a comprehensive museum records search and literature review, (2) a paleontological field survey, and (3) preparation of this technical report of findings that includes recommended mitigation measures.

DATES OF INVESTIGATION

The museum records searches were performed between May 7 and June 17, 2009. The paleontological reconnaissance survey of the proposed Project site was performed May 25 through June 19, 2009. This technical report was completed in July 2009.

RESULTS OF THE INVESTIGATION

According to geologic mapping by Jennings (1967) and Stone and Pelka (1989), the PSPP site is underlain by Quaternary alluvial, aeolian, and lake bed deposits ranging from Pleistocene (1.8 million years old [Ma] to 10,000 years before present [BP]) to Holocene (10,000 years BP to Recent) in age. Quaternary lake bed deposits, which date to the Pleistocene and have the potential to produce significant vertebrate fossils, are present both at the surface and subsurface within the Project area. Museum collections records maintained by the Natural History Museum of Los Angeles County (LACM), the San Bernardino County Museum (SBCM), and the Colorado Desert District Stout Research Center (CDDSRC) indicate that no previously recorded fossil localities exist within the Project site boundaries, nor have any fossil localities been previously recorded within 1 mile of these boundaries. However, numerous vertebrate fossil localities have been recorded throughout the region within the same or similar sedimentary deposits that occur within the Project boundaries.

No significant fossils were discovered during the field survey; however, a total of four non-significant fossil occurrences yielding petrified wood and one non-significant fossil point yielding non-diagnostic vertebrate material were recorded. All specimens were discovered *ex situ* (removed from their original place of fossilization) as lag deposits transported an unknown distance and re-deposited on top of alluvial

sediments. For this reason, and due to the lack of diagnostic characteristics, none of the fossil resources discovered on the surface within the Project site are considered scientifically significant. For the purposes of surface clearance, the vertebrate fossils were collected and examined by vertebrate paleontologists and subsequently determined to be unidentifiable. No petrified wood was collected throughout the course of the survey.

The combined results of the museum records searches, literature review, and field survey indicate that almost the entire Project site is underlain by geologic sediments determined to have a paleontological sensitivity ranging from low to high, increasing with depth. A small portion within the area of disturbance in the far northeast corner of the Project area is underlain by geologic sediments with a high paleontological sensitivity both at the surface and at depth. Therefore, construction of the PSPP may potentially result in an adverse impact to nonrenewable fossil resources and will require implementation of paleontological resources mitigation measures to reduce such impacts to a less-than-significant level.

RECOMMENDATIONS

SWCA recommends that a qualified paleontologist be retained to design and implement a paleontological resources monitoring and mitigation plan (PRMMP) for regulatory agency approval and subsequent implementation during any ground disturbances related to the proposed Project. All significant fossils recovered during construction monitoring should be prepared, stabilized, identified, and permanently curated in an approved repository or museum such as the SBCM. As was the case for the investigation reported in this document, all future paleontological field work for the PSPP would require a Paleontological Resources Use Permit issued by the Bureau of Land Management (BLM) and Field Authorization issued by the local BLM Field Office.

DISPOSITION OF DATA

This report will be filed with AECOM Environment, the Applicants, the California Energy Commission, the BLM California State Office, and the SBCM. The fossil specimen discovered at 090608-JJS-01 will be transferred to the SBCM for permanent curation. A copy of the report will be retained at SWCA Environmental Consultants, along with maps, field notes, photographs, and all other records relating to the Project.

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INTRODUCTION

This report presents the findings of a comprehensive literature review, museum records search, and pedestrian field survey conducted for the Palen Solar Power Project (PSPP or Project) located north of Interstate 10 (I-10) approximately 10 miles east of Desert Center in Riverside County, California. Solar Millennium, LLC and Chevron Energy Solutions (the Applicants) propose to develop a nominal 500 megawatt (MW) solar thermal electric generating facility on public lands managed by the BLM and includes a privately owned 40-acre parcel (under purchase option by the Applicants). The PSPP comes under the jurisdiction of both the CEC and BLM and the two agencies are conducting a joint review of the Project. The paleontological studies documented in this report are intended to support CEC compliance with the requirements of the CEQA and BLM's compliance with the NEPA; a combined CEQA/NEPA document will be prepared jointly by the two agencies.

The Project will require a double circuit 230 kV transmission line to interconnect its output with the regional transmission system, but the route of this transmission has not yet been finalized. For that reason no paleontological investigation of a transmission route for the PSPP has been performed to date. When the route is finalized, the necessary paleontological investigation and impact assessment will be performed and the results reported to the regulatory agencies and other stakeholders.

This study was performed to evaluate the paleontological sensitivity of the Project area and vicinity, assess potential Project-related impacts on paleontological resources, and provide recommendations for the management of paleontological resources. This study was conducted in accordance with the professional guidelines established by the Society of Vertebrate Paleontology (SVP) (1995) and paleontological guidelines set for by the BLM (2008). This study also satisfies the requirements set forth by the CEC (2000, 2007).

DEFINITION AND SIGNIFICANCE OF PALEONTOLOGICAL RESOURCES

Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. The fossil record is the only evidence that life on earth has existed for more than 3.6 billion years. Fossils are considered nonrenewable resources because the organisms they represent no longer exist (Murphey and Daitch, 2007). Thus, once destroyed, a fossil can never be replaced. Fossils are an important scientific and educational resource because they are used to:

- Study the phylogenetic relationships between extinct organisms, as well as their relationships to modern groups.
- Elucidate the taphonomic, behavioral, temporal, and diagenetic pathways responsible for fossil preservation, including biases in the fossil record.
- Reconstruct ancient environments, climate change, and paleoecological relationships.
- Provide a measure of relative geologic dating, which forms the basis for biochronology and biostratigraphy, and which is an independent and supporting line of evidence for isotopic dating.
- Study the geographic distribution of organisms and tectonic movements of land masses and ocean basins through time.
- Study patterns and processes of evolution, extinction, and speciation.
- Identify past and potential future human-caused effects to global environments and climates (Murphey and Daitch, 2007).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Fossils are classified as nonrenewable scientific resources and are protected by various laws, ordinances, regulations, and standards (LORS) across the country. The SVP (1995) has established professional standards for the assessment and mitigation of adverse impacts to paleontological resources. This paleontological assessment was conducted in accordance with the LORS that are applicable to paleontological resources within the Project area. These LORS are summarized in Table 1 and the following sections.

FEDERAL

Fossils are classified as nonrenewable scientific resources and are protected by various LORS across the country. Professional standards for the assessment and mitigation of adverse impacts on paleontological resources have been established by the SVP (1995, 1996). Federal protections for scientifically significant paleontological resources apply to projects if any construction or other related project impacts occur on federally owned or managed lands, involve the crossing of state lines, or are federally funded. Since the PSPP site is located virtually entirely (all but one 40-acre parcel of a 5,200-acre Right-of-Way) within federally managed land, then federal protections would apply to paleontological resources within the Project boundaries. Pertinent federal LORS are summarized below.

National Environmental Policy Act

The National Environmental Policy Act of 1969 (NEPA), as amended (Public Law [PL] 91-190, 42 United States Code [USC] 4321-4347, January 1, 1970, as amended by PL 94-52, July 3, 1975; PL 94-83, August 9, 1975; and PL 97-258 Section 4(b), September 13, 1982), recognizes the continuing responsibility of the federal government to "preserve important historic, cultural, and natural aspects of our national heritage..." (Section 101 [42 USC Section 4321]) (No. 382).

The goal of the NEPA process is to make informed, publicly supported decisions regarding environmental issues. Under NEPA, the federal government requires that:

a) all federal agencies consider the environmental impacts of proposed actions;

b) the public be informed of the potential environmental impacts of proposed actions; and

c) that the public be involved in planning and analysis relevant to actions that impact the environment.

Paleontological Resources Preservation Act

In March 2009, the Paleontological Resources Preservation Act (PRPA) was enacted as a result of the passage of the Omnibus Public Lands Management Act (OPLA) of 2009, PL 111-011. PL 111-011, Title VI, *Subtitle D. Paleontological Resources Preservation* (OPLA-PRPA). The OPLA-PRPA sets forth regulations and provisions pertaining to paleontological resources on all federally administered lands. The OPLA-PRPA affirms the authority of BLM policies already in place and is consistent with paleontological guidelines outlined in the Paleontology Resources Management Manual and Handbook H-8270-1 (BLM, revised 2008). As a result of the recent enactment of the OPLA-PRPA, federal agencies will begin developing appropriate plans for the management of paleontological resources and the implementation of the OPLA-PRPA.

Federal Land Management and Policy Act

The Federal Land Management and Policy Act of 1976 (FLMPA) (43 USC 1712[c], 1732[b] Section 2, Federal Land Management and Policy Act of 1962 [30 USC 611]; Subpart 3631.0 et seq., Federal Register Vol. 47, No. 159, 1982) does not refer specifically to fossils. However, "significant fossils" are understood and recognized in policy as scientific resources. Permits authorizing the collection of significant fossils for scientific purposes are issued under the authority of FLMPA.

Under FLMPA, federal agencies are charged to:

a) manage public lands in a manner that protects the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, archaeological, and water resources, and, where appropriate, preserve and protect certain public lands in their natural condition (Section 102[a][8] [11]);

b) periodically inventory public lands so that the data can be used to make informed land-use decisions (Section 102[a][2]); and

c) regulate the use and development of public lands and resources through easements, licenses, and permits (Section 302[b]).

American Antiquities Act of 1906 1 (6 USC 431 433)

The American Antiquities Act establishes a penalty for disturbing or excavating any historic or prehistoric ruin or monument or object of antiquity on federal lands as a maximum fine of $500 or 90 days in jail.

National Historic Preservation Act of 1966

The National Historic Preservation Act (NHPA) provides for the survey, recovery, and preservation of significant paleontological data when such data may be destroyed or lost due to a federal, federally licensed, or federally funded project (PL 89 665; 80 Stat. 915, 16 USC 470 et seq.).

Code of Federal Regulations Title 43

Under the Code of Federal Regulations (CFR) Title 43, Section 8365.1-5, the collection of scientific resources, including vertebrate fossils, is prohibited without a permit. Except where prohibited, individuals are also authorized to collect some fossils for their personal use. The use of fossils found on federal lands for commercial purposes is also prohibited.

Department of the Interior Report—Fossils on Federal and Indian Lands

In 2000, the Secretary of the Interior submitted a report to Congress titled "Assessment of Fossil Management on Federal and Indian Lands." This report was prepared with the assistance of eight federal agencies, including the Bureau of Indian Affairs, the BLM, the Bureau of Reclamation, the U.S. Fish and Wildlife Service, the U.S. Forest Service (USFS), the National Park Service, the U.S. Geological Survey (USGS), and the Smithsonian Institution. The consulting agencies concluded that administrative and Congressional actions with respect to fossils should be governed by these seven basic principles:

a) Fossils on federal land are a part of America's heritage.

b) Most vertebrate fossils are rare.

c) Some invertebrate and plant fossils are rare.

d) Penalties for fossil theft should be strengthened.

e) Effective stewardship requires accurate information.

f) Federal fossil collections should be preserved and available for research and public education.

g) Federal fossil management should emphasize opportunities for public involvement.

STATE

The California Energy Commission (CEC) environmental review under the Warren-Alquist Act is considered a California Environmental Quality Act (CEQA)–equivalent process under California law. The CEQA Guidelines (Title 14, California Code of Regulations Sections 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA. Appendix G to Section 15023 includes an "Environmental Checklist" of questions that a lead agency should address if relevant to a project's environmental impacts, including: "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" The Environmental Checklist also asks: "Does the project have potential to eliminate important examples of the major periods of California history or pre-history?" Fossils are important examples of periods of California pre-history.

Other state requirements for paleontological resources management are included in Public Resources Code sections 5097.5. This statute prohibits the removal of any paleontological site or feature from state public lands without permission of the jurisdictional agency, defines the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts to paleontological resources from developments on public (state) lands. These protections would apply to the project only if the state were to obtain ownership of project lands during the term of its license.

LOCAL

Paleontological resources are addressed in the Multipurpose Open Space Element of the County of Riverside General Plan (adopted October 7, 2003). The following policies provide direction for paleontological resources:

> OS 19.8 "Whenever existing information indicated that a site proposed for development may contain biological, paleontological, or other scientific resources, a report shall be filed stating the extent and potential significance of the resources that may exist within the proposed development and appropriate measures through which the impacts of development may be mitigated."
>
> OS 19.9 "This policy requires that when existing information indicates that a site proposed for development may contain paleontological resources, a paleontologist shall monitor grading activities, with the authority to halt grading to collect uncovered paleontological resources, curate any resources collected with an appropriate repository, and file a report with the Planning Department documenting any paleontological resources that are found during the course of site grading."
>
> OS 19.10 "Transmit significant development applications subject to CEQA to the San Bernardino County Museum for review, comment, and/or preparation of recommended conditions of approval with regard to paleontological resources."

Table 1. Summary of Paleontological LORS Applicable to the Project

Jurisdiction	Pertinent Paleontological LORS
Federal	NEPA
	OPLA-PRPA
	FLMPA
	American Antiquities Act of 1906
	National Historic Preservation Act of 1966
	Code of Federal Regulations Title 43
	Department of Interior—Fossils on Federal and Indian Lands
State	CEQA
County	Riverside County General Plan

PROFESSIONAL STANDARDS

The SVP has established standard guidelines (SVP, 1995) that outline professional protocols and practices for the conducting of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Typically, state regulatory agencies with paleontological LORS accept and use the professional standards set forth by the SVP.

As defined by the SVP (1995:26), significant nonrenewable paleontological resources are defined as:

> …Fossils and fossiliferous deposits here restricted to vertebrate fossils and their taphonomic and associated environmental indicators. This definition excludes invertebrate or paleobotanical fossils except when present within a given vertebrate assemblage. Certain invertebrate and plant fossils may be defined as significant by a project paleontologist, local paleontologist, specialists, or special interest groups, or by lead agencies or local governments.

As defined by the SVP (1995:26), significant fossiliferous deposits are defined as:

> A rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., trackways, or nests and middens which provide datable material and climatic information). Paleontologic resources are considered to be older than recorded history and/or older than 5,000 years, BP [before present].

Based on the significance definitions of the SVP (1995), all identifiable vertebrate fossils are considered to have significant scientific value. This position is held because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information on the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association

with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

A geologic unit known to contain significant fossils is considered to be "sensitive" to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either disturb or destroy fossil remains directly or indirectly. This definition of sensitivity differs fundamentally from that for archaeological resources as follows:

> It is extremely important to distinguish between archaeological and paleontological (fossil) resource sites when defining the sensitivity of rock units. The boundaries of archaeological sites define the areal extent of the resource. Paleontologic sites, however, indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontologic potential in each case. [SVP, 1995]

Many archaeological sites contain features that are visually detectable on the surface. In contrast, fossils are contained within surficial sediments or bedrock and are therefore not observable or detectable unless exposed by erosion or human activity. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken in order to prevent adverse impacts to these resources.

BUREAU OF LAND MANAGEMENT

The BLM manages fossils for their scientific, educational, and (where appropriate) recreational values. Scientifically significant fossils, such as vertebrates and noteworthy occurrences of invertebrates and plants, may be collected by qualified individuals who have obtained Paleontological Resources Use permits from the BLM. All fossils collected under these permits must be stored and preserved in approved repositories where they can be studied or displayed. Potential adverse impacts on significant fossils are assessed and mitigated to prevent damage or lessen negative effects on the resources. The BLM inventories and monitors paleontological resources on a case-by-case basis under the guidance of Handbook H-8270-1 (2008). When notice of a proposed land use is received, the pertinent Field Office determines whether significant resources may be impacted and whether a field survey and subsequent work are necessary.

Four objectives have been identified by the BLM for the management of paleontological resources on the lands it administers. These include (1) locating, evaluating, managing, and protecting paleontological resources; (2) facilitating appropriate scientific, educational, and recreational uses of paleontological resources; (3) ensuring that proposed land uses do not inadvertently damage or destroy important paleontological resources; and (4) fostering public awareness of the nation's rich paleontological heritage. The BLM considers vertebrate fossils to be scientifically significant, whereas invertebrate and plant fossils may be deemed scientifically significant on a case-by-case basis. Fossilized wood is considered a mineral resource, and may be collected or purchased under the Material Sales Act of 1947 (as amended), but cannot be obtained under the General Mining Law of 1872.

RESOURCE ASSESSMENT GUIDELINES

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under federal (NEPA), state (CEQA), and local (County of Riverside) laws and regulations. This study satisfies project requirements in accordance with CEQA (13 PRC, 2100

et seq.) and Public Resources Code Section 5097.5 (Stats 1965, c 1136, p. 2792). This analysis also complies with guidelines and significance criteria specified by the SVP (1995) and requirements set forth by the CEC in Appendix B, Information Requirements for an Application of the CEC's Power Plant Site Certification Regulations (CEC, 2000). The study also is consistent with BLM policies and paleontological guidelines outlined in the Paleontology Resources Management Manual and Handbook H-8270-1 (BLM, revised 2008)

Paleontological Sensitivity

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In its "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources," the SVP (1995:23) defines three categories of paleontological sensitivity (potential) for sedimentary rock units: high, low, and undetermined:

- **High Potential.** Rock units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered and are considered to have a high potential for containing significant nonrenewable fossiliferous resources. These units include, but are not limited to, sedimentary formations and some volcanic formations that contain significant nonrenewable paleontologic resources anywhere within their geographical extent and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical, and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas that contain potentially datable organic remains older than Recent, including deposits associated with nests or middens, and areas that may contain new vertebrate deposits, traces, or trackways are also classified as significant.
- **Low Potential.** Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections.
- **Undetermined Potential.** Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials.

It should be noted that highly metamorphosed rocks and granitic rock units do not generally yield fossils and therefore have low potential to yield significant nonrenewable fossiliferous resources.

In general terms, for geologic units with high potential, full-time monitoring typically is recommended during any project-related ground disturbance. For geologic units with low potential, protection or salvage efforts typically are not required. For geologic units with undetermined potential, field surveys by a qualified paleontologist are usually recommended to specifically determine the paleontologic potential of the rock units present within the study area.

PROJECT LOCATION AND DESCRIPTION

Solar Millennium LLC and Chevron Energy Solutions (the Applicants) are proposing to construct a nominal 500 MW solar thermal electric power generating facility, referred to as the Palen Solar Power Project (PSPP or Project). The PSPP would be located in the southern California inland desert, about 10 miles east of

Desert Center, in Riverside County (Figure 1). The Applicants seek to lease 5,200 acres of federal land administered by the BLM, on which the proposed facilities would occupy approximately 2,974 acres. The Project would utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola. A heat transfer fluid (HTF) is heated to high temperature (750 °F) as it circulates through the receiver tubes. The heated HTF is then piped through a series of heat exchangers where it releases its stored heat to generate high pressure steam. The steam is then fed to a traditional steam turbine generator where electricity is produced.

The Project's nominal output of 500 MW would be, produced by two adjacent, identical and independent 250 MW units. The two power generating facilities would share a main office building, a main warehouse/maintenance building, a parking lot, onsite access roads, a bioremediation area for HTF-contaminated soil, and a central internal switchyard. Each unit would have its own solar field, comprised of piping loops arranged in parallel groups, and its own power block, centrally located within the solar field. Each power block will have its own HTF pumping and freeze protection system, solar steam generator; steam turbine generator; an air-cooled condenser for cooling, transmission lines and related electrical system; and auxiliary equipment, e.g., water treatment system, emergency generators. From the onsite switchyard, a common new double circuit 230 kV transmission line will interconnect with Southern California Edison's (SCE) Devers-Palo Verde transmission line at the planned Red Bluff substation whose location has not been finalized but is expected to be in the general vicinity of Desert Center west of the PSPP site.

The Project would use a gas-fired boiler for quick startup and for HTF freeze protection, but not for power generation. The fuel will be LPG (propane), which will be stored in onsite tanks supplied via regular truck deliveries. Thermal power plants require cooling which historically has involved large quantities ofcooling water. The PSPP will utilize an air cooled condenser (ACC) commonly referred to as "dry cooling", thereby dramatically reducing the amount of water needed by the facility. Water would be used principally forsolar mirror washing , ancillary equipment heat rejection, feed water makeup, dust suppression, firewater supply, and onsite domestic use. Total consumption for both units is estimated at approximately 300 acre-feet annually supplied by onsite wells

Project construction is scheduled to begin in late 2010. Commercial operation is expected to begin in with the first unit by mid-2013 followed by commercial operation of the second unit by year end 2013.

PROJECT PERSONNEL

SWCA paleontologists Jessica DeBusk, B.S., Justin Strauss, M.S., Stephanie Lukowski, M.S., Benjamin Borkan, B.S. (in progress), and Peter Kloess, B.S., conducted fieldwork. Ms. DeBusk requested the museum records searches, managed field staff, and authored this technical report. David Daitch, Ph.D. and Georgia Knauss, M.S. examined the fossil specimens for identification. GIS Specialists Chad Flynn and John Covert produced graphics. Technical Editor Michelle Treviño edited and formatted this report. Cara Corsetti, M.S., Qualified Paleontologist and SWCA Paleontology Program Director, served as Principal Investigator.

METHODS

Due to the nature of the fossil record, paleontologists cannot know either the quality or the quantity of fossils present in a given geologic unit prior to natural erosion or human-caused exposure. Therefore, in the absence of surface fossils, it is necessary to assess the sensitivity of rock units based on their known

potential to produce scientifically significant fossils elsewhere within the same geologic unit (both within and outside of the study area) or a unit representative of the same depositional environment.

MUSEUM RECORDS SEARCH

For this project, museum records searches were performed by the Vertebrate Paleontology Section of the Natural History Museum of Los Angeles County (LACM), the Department of Earth Sciences at the San Bernardino County Museum (SBCM), and the Colorado Desert District Stout Research Center (CDDSRC). Museum collections records were searched to determine whether there are any known fossil localities in or near the project site, to identify the geologic units present in the Project area, and to determine the paleontological sensitivity ratings of those geologic units to assess potential impacts to nonrenewable paleontological resources. Published and unpublished literature and geologic maps were reviewed, and mitigation measures specific to this project were developed in accordance with the SVP's professional standards and guidelines (1995).

Geologic units were assigned a paleontological sensitivity rating based on the museum records search and literature review. For the area underlying the project area, geologic maps and paleontological sensitivity maps were created.

FIELD SURVEY

A pedestrian reconnaissance survey of the Project area was performed between May 25 and June 19, 2009. The purpose of the fieldwork was to inspect the study area for surface fossils and exposures of potentially fossil-bearing geologic units and to determine areas in which fossil-bearing geologic units could be exposed during project-related ground disturbances. For the purposes of this analysis, only the areas of disturbance, including a 200-foot buffer, were surveyed for paleontological resources (Figure 1). Note that the associated linear facilities to the south of the Project site, including a natural gas line and access roads, are no longer a part of the PSPP; however, these areas are included in this technical report because they were defined as within the Project's area of disturbance at the time the paleontological resources field work was accomplished. The survey data for the area that is no longer part of the Project is not included in the Project impact analysis. However, the survey data is included in this report to add to the body of scientific knowledge.

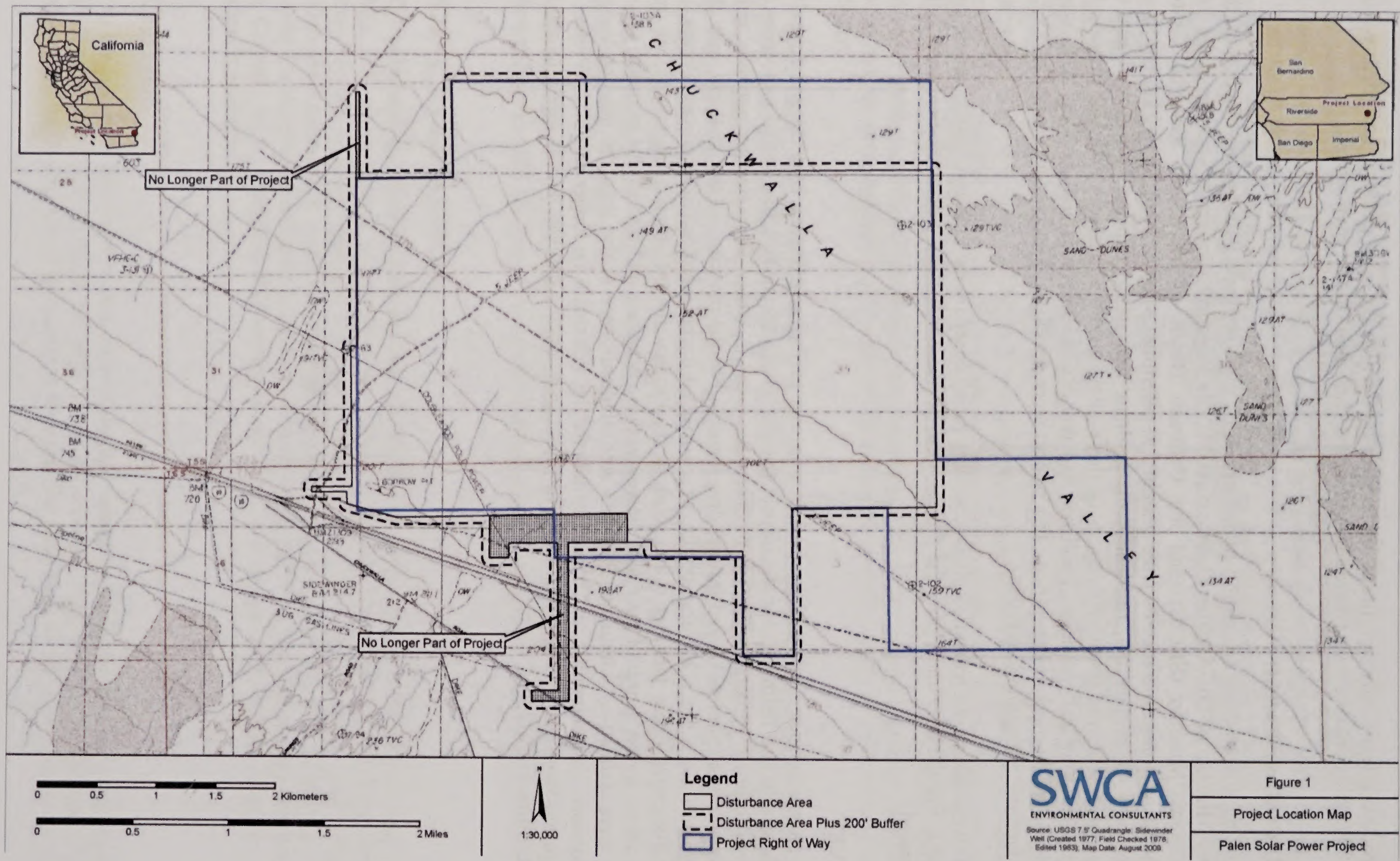

Figure 1. Project Location

GEOLOGY AND PALEONTOLOGY

GEOLOGIC SETTING

California is naturally divided into the following 12 geomorphic provinces, each distinguished from one another by having unique topographic features and geologic formations: (1) the Sierra Nevada, (2) the Klamath Mountains, (3) the Cascade Range, (4) the Modoc Plateau, (5) the Basin and Range, (6) the Mojave Desert, (7) the Colorado Desert, (8) the Peninsular Ranges, (9) the Transverse Ranges, (10) the Coast Ranges, (11) the Great Valley, and (12) the Offshore area. The PSPP site is located in the northeast corner of the Colorado Desert geomorphic province. The Colorado Desert is bounded to the east by the Colorado River, to the south by the international border, and to the west by the Peninsular Ranges. Norris and Webb (1976) define the northern border as the southern edge of the eastern Transverse Ranges and the San Bernardino–Riverside county line.

The PSPP site is located within Chuckwalla Valley, situated between the Chuckwalla Mountains to the south and the Palen and Coxcomb Mountains to the north (Jennings, 1967). Alluvial divides reaching up to 1,500 feet above mean sea level (msl) serve as boundaries between the mountain ranges to the north and west of the valley (Brown, 1923). The valley is dominated by up to 1,200 feet of sand, gravel, and clay derived from the surrounding highlands (Brown, 1923) and contains numerous dry lake beds that are separated by sand dunes (Norris and Webb, 1976). The surrounding mountains reach 2,000 to 4,000 feet above msl and the lowest point of the valley is Ford Dry Lake, located southeast of the project area at an elevation of around 360 feet above msl (Brown, 1923). These lake beds, alluvial sediments, and sand dunes underlie the PSPP project site and are depicted in Figure 2 and discussed in more detail in the following sections.

SITE-SPECIFIC GEOLOGY AND PALEONTOLOGY

According to geologic mapping by Jennings (1967) and Stone and Pelka (1989), the PSPP site is underlain by Quaternary alluvial, aeolian, and lake bed deposits ranging from Pleistocene (1.8 million years old [Ma] to 10,000 years before present [BP]) to Holocene (10,000 years BP to Recent) in age (Figure 2). Quaternary lake bed deposits, which date to the Pleistocene and have the potential to produce significant vertebrate fossils, are present both at the surface and subsurface within the project area. These units, and their paleontological resource potential, are depicted in Figures 2 and 3 and discussed in more detail in the following sections.

Quaternary Lake Bed Deposits (Ql)

Surficial exposures of Quaternary lake bed deposits occur in the northeastern portion of the PSPP site and may also be found at the subsurface underlying both aeolian deposits and younger alluvium (Figure 2). Quaternary lake bed deposits, mapped by Jennings (1967) as “Ql,” are locally weakly consolidated to slightly dissected and in part overlain by modern playa deposits consisting of partly gypsiferous silt and clay (Stone and Pelka, 1989). Jennings (1967) and Stone et al. (1985) date these sediments to the Holocene and the latest Pleistocene. These Quaternary lacustrine sediments were likely deposited as a result of an expanded ancient Palen Lake (now Palen Dry Lake) located very close to the northeastern corner of the Project site (McLeod, 2009). Quaternary lake beds and similar deposits nearby and elsewhere in the Mojave Desert have produced numerous fossil vertebrate localities (McLeod, 2009; Scott, 2009; Jefferson, 1989, 1991; Reynolds, 1989). Therefore, these sediments are determined to have a high paleontological sensitivity.

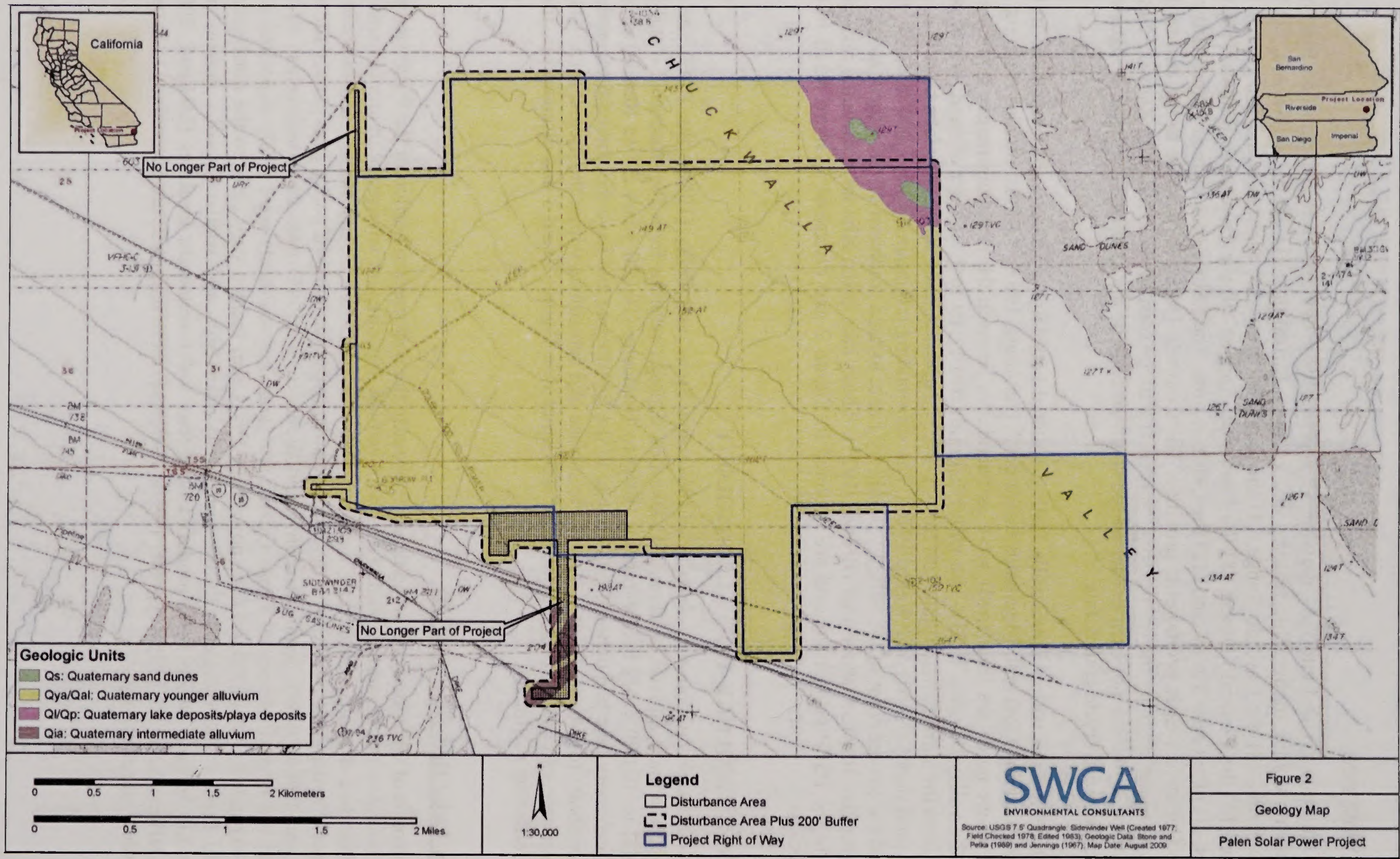

Figure 2. Geologic Map

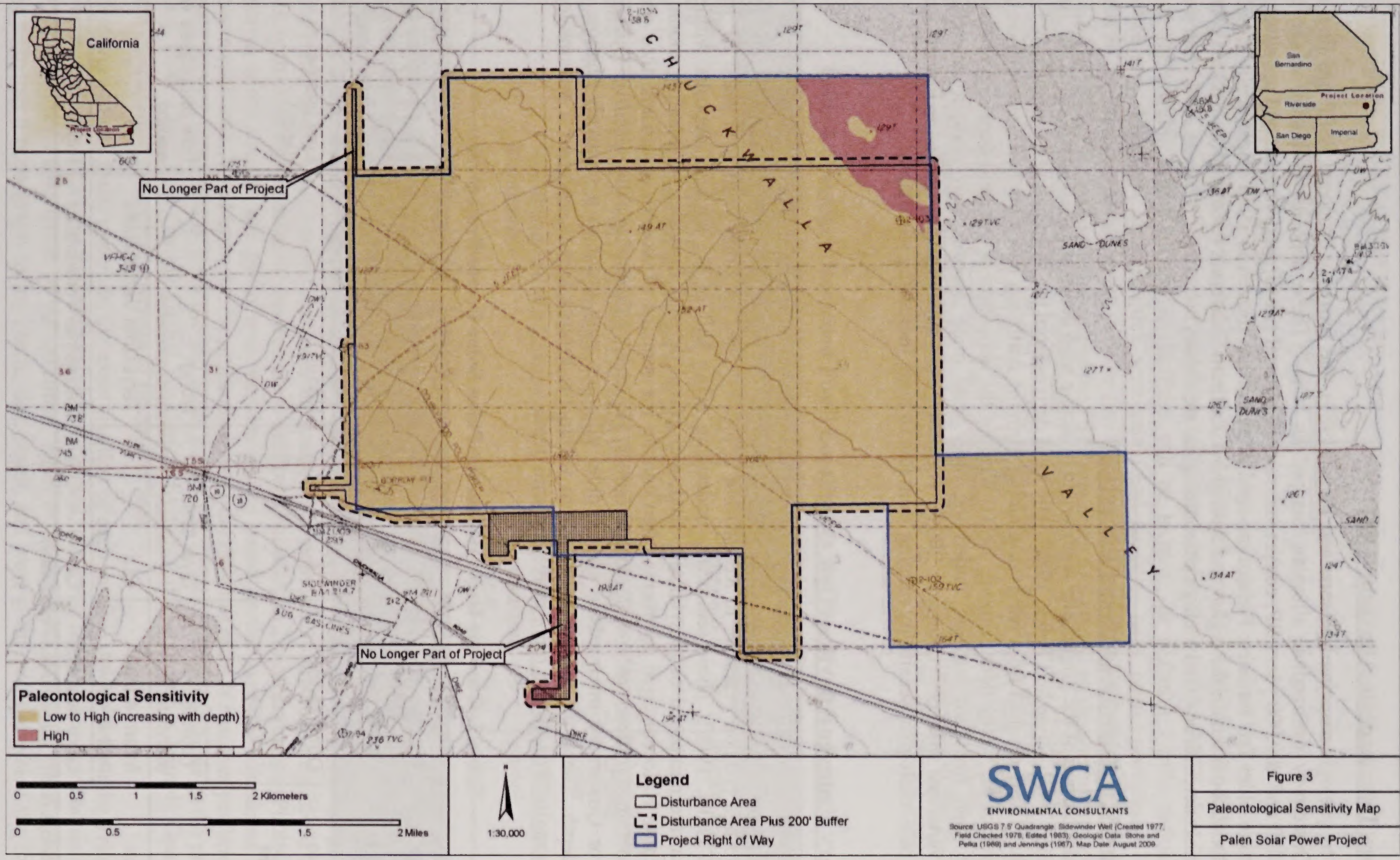

Figure 3. Paleontological Sensitivity

Quaternary Intermediate Alluvium (Qia)

According to geologic mapping by Stone and Pelka (1989), the formerly proposed PSPP gas line route traversed Quaternary intermediate alluvium, mapped as "Qia." These deposits, estimated in age to be between 2,000 and 200,000 years BP, consist variously of alluvial gravel, sand, and silt and are situated on top of inactive older fan surfaces. Pleistocene-aged alluvium has proven to yield scientifically significant vertebrate fossils both within the region and throughout southern California (Scott, 2009; McLeod, 2009); thus, this unit is determined to have a high paleontological sensitivity.

Quaternary Windblown Sand/Sand Dunes (Qs)

The northeast portion of the project site is underlain by active sand dunes and sand sheets, "Qs," of Recent age (Jennings, 1967; Stone and Pelka, 1989). The sand derives from the surrounding mountains, and dune formation has likely resulted from winds originating from the northwest based on their accumulation in the southeast area of the valley floor (Brown, 1923). Whereas the uppermost active sand dune deposits are not likely to contain fossilized remains, underlying older sand dune deposits may contain scientifically significant vertebrate specimens (McLeod, 2009). Therefore, sand dune deposits within the Project area are assigned a paleontological sensitivity ranging from low to high, increasing with depth.

Quaternary Younger Alluvium (Qya, Qal)

Much of Chuckwalla Valley is underlain by Quaternary younger alluvium, mapped as "Qal" by Jennings (1967) and "Qya" by Stone and Pelka (1989). Quaternary younger alluvium is generally reported as Holocene in age (10,000 years BP to Recent) but is locally dated as 2,000 years to 0 years BP in age (Stone and Pelka, 1989). These sediments, underlying about half of the surficial deposits within the project area, are composed of alluvial silt, sand, and gravel derived from the surrounding mountains. Although these Holocene-aged sediments often contain the remains of modern organisms, they are too young to contain significant paleontological resources. However, paleontologically sensitive Quaternary lake beds or Quaternary intermediate age or older alluvium may occur at a relatively shallow but unknown depth. Therefore, Quaternary alluvium within the Project area is assigned a paleontological sensitivity ranging from low to high, increasing with depth.

Table 2. Geologic Units Within the Palen Solar Power Project Area

Age	Geologic Unit	Map Abbreviation*	Typical Fossil Types	Paleontological Resource Potential (Sensitivity)
Holocene to Latest Pleistocene	Dune sands	Qs	None	Low (increases with depth)
	Younger alluvium	Qya, Qal	None	Low (increases with depth)
Pleistocene	Intermediate-age alluvium	Qia	Terrestrial Vertebrates	High
	Lake deposits	Ql	Terrestrial Vertebrates	High

Sources: Jennings (1967) and Stone and Pelka (1989)

ANALYSIS AND RESULTS

MUSEUM RECORDS SEARCH

A review of museum collections records at the LACM, SBCM, and CDDSRC confirmed that no fossil localities have been previously recorded within the area that will be disturbed by PSPP construction and operation (and within which all Project facilities will be located), or within a 1-mile radius of the disturbance area. However, at least three vertebrate fossil localities have been previously recorded southwest of the Project area within the same or similar sediments (McLeod, 2009; Scott, 2009; Jefferson, 2009). LACM 5977, located east-southeast of the PSPP site north of I-10 and on the southwest side of Ford Dry Lake, yielded fossilized remains of *Perognathus* (pocket mouse). LACM (CIT) 208 and LACM 3414, located north-northwest of the proposed PSPP project site between Eagle and Coxcomb Mountains, yielded fossilized remains of *Gopherus* (tortoise), *Equus* (horse), *Camelops* (camel) and *Tanupolama stevensi* (llama). The depth at which these localities were discovered was not reported by the LACM; however, the SBCM indicates that significant vertebrate fossil remains have often been discovered in this region from similar Pleistocene deposits at a depth of approximately 5 feet or more below the ground surface (Scott, 2009).

Table 3. Previously Recorded Fossil Localities in the Vicinity of the Project

Geological Formation	Museum Locality Number and Approximate Location*	Taxon	Common Name
Quaternary Alluvium	LACM 5977; east-southeast of the proposed project area north of I-10 and on the southwest side of Ford Dry Lake	*Perognathus*	Pocket mouse
Quaternary Alluvium (Pinto Formation)	LACM (CIT) 208 and LACM 3414; north-northwest of the proposed project area between the Eagle Mountains and the Coxcomb Mountains	*Gopherus*	Tortoise
		Equus	Horse
		Camelops	camel
		Tanupolama stevensi	camel

*LACM = Natural History Museum of Los Angeles County

FIELD SURVEY

A comprehensive field survey of the Project disturbance area and 200-foot buffer was performed between May 25 and June 19, 2009. The entire Project area was relatively flat and scarcely to moderately vegetated (Photograph 1). A transect survey of the entire study area was conducted using 25- to 50-meter intervals, with close examination of exposed cross-sections (Photograph 2) and drainages (Photograph 3). The interval width used in any given area was determined based on the expected abundance of fossil materials in each area, based upon the recommendations of the museum records searches performed prior to the field survey, inspection of geologic and aerial maps, and visual observations made in the process of surveying. Both a handheld Garmin Global Positioning System (GPS) unit and a Trimble GeoXT GPS unit were used to ensure complete coverage of the project area.

Upon discovery of any fossil materials, the exact location of each fossil was recorded on the Trimble unit and a variety of information was recorded for each specimen, including notes on the material on which it was found and a brief description of the specimen. A set of photographs were also taken at each fossil locality, including a photograph facing north, east, south, and west at the point at which the fossil was

found, a view of the location at which the fossil was found from a short distance away, and two or more photographs of the specimen itself were taken. If warranted, the fossil was then collected by hand, wrapped in tissue paper, and placed within a plastic bag with a field label.

Within the PSPP site and associated linear alignments, the paleontological field survey recorded four non-significant fossil occurrences yielding petrified wood and one non-significant fossil point yielding non-diagnostic vertebrate material (Attachment A). All specimens were discovered *ex situ* (removed from their original place of fossilization) as lag deposits transported and unknown distance and re-deposited on top of alluvial sediments. For this reason, and due to the lack of diagnostic characteristics, none of the fossil resources discovered within the project site are considered significant. For the purposes of surface clearance, the vertebrate fossil specimen was collected and examined by a qualified vertebrate paleontologist to confirm that it was not identifiable (Attachment B). No petrified wood was collected throughout the course of the survey, but all occurrences were photo documented (Photograph 4).

Table 4. Newly Recorded Fossil Occurrences Within the PSPP Boundaries

Geologic Formation*	SWCA Field Number**	Taxa and Description	Significance
Quaternary younger alluvium	090608-JJS-02	Mammal jaw fragment?	Non-significant
	F3-090619-01	Petrified wood	Non-significant
	F3-090619-02	Petrified wood	Non-significant
	F3-090619-03	Petrified wood	Non-significant
Quaternary intermediate alluivum	F3-090619-04	Petrified wood	Non-significant

*Float

**Field numbers F3-090619-01-F3090619-04 were discovered outside of the current PSPP boundaries in the formerly proposed gas line and access road alignments.

Photograph 1. View of typical ground visibility within northeastern portion of the PSPP site, looking northeast.

Photograph 2. View of playa exposure, northeastern portion of the project area.

Photograph 3. View of alluvial deposits along drainage.

Photograph 4. Fossil occurrence F3-090619-04.

CONCLUSIONS

The destruction of fossils as a result of human-caused ground disturbance has a significant cumulative impact, as it makes biological records of ancient life permanently unavailable for study by scientists. Implementation of proper mitigation measures can, however, reduce the impacts to the paleontological resources to below the level of significance. Construction of the PSPP has the potential to result in the destruction of sub-surface paleontological resources via breakage and crushing related to ground-disturbing activities during grading for the proposed facilities (e.g., solar field, power block, ancillary facilities, drainage channels, and access road). Project ground disturbance and terrain modification, expected to disturb 4,500,000 cubic yards of sediments, has the potential to adversely affect an unknown quantity of fossils that may occur on or underneath the surface in areas containing paleontologically sensitive geologic units. Although no significant paleontological resources were identified within the Project area during the course of the field survey, the majority of the PSPP site is underlain by geologic sediments determined to have a paleontological sensitivity ranging from low to high, increasing with depth. The far northeastern corner of the project is underlain by geologic sediments determined to have a high paleontological sensitivity at the surface as well as at depth (Figure 3).

As discussed immediately below (Recommended Mitigation Measures), all Project ground disturbances in Quaternary lake bed deposits will be monitored on a full-time basis because of their high paleontological sensitivity. All ground disturbances in Quaternary younger alluvium and in windblown sand/sand dune deposits (at or less than 5 feet in depth) will be spot-checked by paleontological monitors; ground disturbances in these areas that are more than 5 feet in depth will be monitored on a full-time basis because of their high sensitivity. No ground disturbances are expected to occur within Quaternary intermediate-age alluvium because the formerly proposed gas line is no longer a part of the Project.

Using information from published geologic maps and the results of the paleontology study of the PSPP site, the locations of the paleontologically sensitive geologic units underlying the proposed Project area were identified and are depicted in Figure 3.

RECOMMENDED MITIGATION MEASURES

Ground-disturbing activities within the PSPP site may result in adverse impacts to significant paleontological resources unless proper mitigation measures are implemented. Implementation of proper mitigation measures can, however, reduce the impacts to the paleontological resources to below the level of significance.

The following mitigation measures have been developed to reduce the potential adverse impacts on paleontological resources to a less-than-significant level. The measures are based on the SVP standard guidelines (1995) and meet the requirements of CEQA. These mitigation measures have been used throughout California and have been demonstrated to be successful in protecting paleontological resources while allowing timely completion of construction projects in paleontologically sensitive areas.

PRE-CONSTRUCTION PHASE

A. Prior to the start of any project related construction (defined as construction-related vegetation clearing, ground disturbance and preparation, and site excavation activities), the project owner shall ensure that the designed paleontological resource specialist approved by the Compliance Project Manager (CPM) is available for field activities and prepared to implement the conditions of certification. The designated paleontological resource specialist shall be responsible for implementing all the paleontological conditions of certification and for using qualified personnel to assist in this work.

B. Prior to the start of construction, a Paleontological Resource Monitoring and Mitigation Plan (PRMMP) drafted by the designated paleontological resource specialist shall be submitted to the CPM for approval. The plan shall identify general and specific measures to minimize potential impacts to sensitive paleontological resources. The project paleontological resource specialist shall implement the Paleontological Resource Monitoring and Mitigation Plan as needed.

The Paleontological Resource Monitoring and Mitigation plan shall include, but not be limited to, the following elements and measures:

- A discussion of the sequence of project-related tasks, such as any pre-construction surveys, fieldwork, flagging or staking; construction monitoring; mapping and data recovery; fossil preparation and recovery; identification and inventory; preparation of final reports; and transmittal of materials for curation;
- Identification of the person(s) expected to assist with each of the tasks identified within this condition, and a discussion of the mitigation team leadership and organizational structure, and the interrelationship of tasks and responsibilities;
- Where monitoring of project construction activities is deemed necessary, the extent of the areas where monitoring is to occur and a schedule for the monitoring;
- An explanation that the designated Paleontological Resource Specialist shall have the authority to halt or redirect construction in the immediate vicinity of a vertebrate fossil find until the significance of the find can be determined;
- A discussion of the equipment and supplies necessary for the recovery of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;
- Inventory, preparation and delivery for curation info a retrievable storage collection in a public repository or museum, which meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources; and
- Identification of the intuition that has agreed to receive any data and fossil materials recovered during project-related monitoring and mitigation work, discussion of any requirements of specifications for materials delivered for curation and how they will be met, and the name and phone number of the contact person at the institution.

C. Prior to the start of construction, the Paleontological Resource Specialist shall prepare a staff training program for review and approval by the CPM. Prior to and throughout the project and as needed, the paleontological resource specialist shall conduct training for the project owner, project managers, construction supervisors, equipment operators and all new employees in accordance with the CPM-approved training plan. Contractor briefings will also be videotaped and used for education for new employees.

The paleontological training program shall address the potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such resources. The training program shall also include the set of reporting procedures that workers are to follow if paleontological resources are encountered during project activities. The training program shall be presented by the designated Paleontological Resource Specialist and may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any other areas of interests or concerns.

CONSTRUCTION PHASE

D. The designated paleontological resource specialist or paleontological monitor(s) shall be present at all times he or she deems appropriate to monitor construction-related grading, excavation, trenching, and/or augering in areas with a significant potential for fossil-bearing sediments to occur. All ground-disturbing activities at depths greater than 5 feet shall be monitored on a full-time basis because of their high paleontological sensitivity (see Figure 3). All ground disturbances at depths less than 5 feet will be "spot-checked" by paleontological monitors. The frequency of the spot checks shall be determined by the Paleontological Resource Specialist and will be based on factors such as the extent of ground disturbance and the location of those disturbances in relation to paleontologically sensitive sediments. Paleontological monitoring will include inspection of exposed rock units and collection of matrix to be testing for the presence of microscopic fossils. Paleontological monitors will have authority to temporarily divert excavations or drilling away from exposed fossils in order to efficiently and professionally recover the fossil specimens and collect associated data.

POST-CONSTRUCTION PHASE

E. The project owner, through the designated paleontological resource specialist, shall ensure recovery, preparation for analysis, analysis, identification and inventory, the preparation for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during the monitoring, data recovery, mapping, and mitigation activities related to the project.

F. The project owner shall ensure preparation of a Paleontological Resources Report by the designated paleontological resource specialist. The Paleontological Resources Report shall be completed following the analysis of the recovered fossil materials and related information. The project owner shall submit the paleontological report to the CPM for approval. The report shall include, but not be limited to, a description and inventory list of recovered fossil materials; a map showing the location of paleontological resources found in the field; determinations of sensitivity and significance; and a statement by the paleontological resource specialist that project impacts to paleontological resources have been mitigated.

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Confidential ATTACHMENT A:
Fossil Locality Map

Confidential ATTACHMENT B:
Fossil Locality Form
Confidential Documents to be submitted under separate cover

Appendix C-2

Paleontological Update 2013

PALEONTOLOGICAL RESOURCES CHARACTERIZATION

In support of the

PETITION TO AMEND

for the

PALEN SOLAR ELECTRIC GENERATING SYSTEM

(09-AFC-7C)

Submitted to the:

California Energy Commission

Submitted by:

PALEN SOLAR HOLDINGS, LLC

Prepared by:

Fred L. Nials
P.O. Box 1005
Laveen, Arizona
fnials@earthlink.net

Prepared for:

centerline

JULY 2013

POTENTIAL FOR PALEONTOLOGICAL RESOURCES IN THE PALEN FOOTPRINT AREA

Paleontological remains have the potential to provide important information regarding paleoecological conditions and geological history of an area. Fossils may be produced by a variety of processes, including production of molds and/or casts, distillation, petrification, or preservation in the original condition. In general, several conditions must be met for the fossilization of organisms:

- The organism must possess body parts suitable for preservation. Bones and teeth are generally most likely to be preserved.
- The remains must undergo rapid burial in a suitable sedimentary medium, and to a sufficient depth to be beyond the lower limits of bioturbation and bacterial/fungal activity. Generally this medium consists of fine-grained sediments indicative of a relatively low-energy environment. Sediments deposited in high-energy environments such as alluvial fans, braided streams, colluvial deposits, etc., typically disarticulate, abrade, and/or crush finer-grained fossil remains. Sediments most suitable for preservation typically include lacustrine, marsh, spring, and some overbank alluvial deposits, especially along perennial streams.
- Fossils preserve best in relatively low-acidity environments. Extremes of pH (acidity) and Eh (oxidation/reduction potential) limit preservation potential.
- Fossilization typically occurs best in sediments that are consistently moist or dry. Alternating wet and dry conditions favor oxidation and other processes that tend to destroy fossils.

Those portions of Chuckwalla Valley in and near the footprint area can be generally characterized as 1) alluvial fan environments, including active washes, 2) aeolian depositional and erosional environments, and 3) ephemeral playa deposits related to dune-damming of Palen Dry Lake. No long-term pluvial lakes existed in the valley (Dohrenwend, et al. 1961, Nials 2013), although extensive playa deposits and shorelines were identified in the Ford Dry Lake sump (Kenney 2010).

Most of the project area is underlain to considerable depth by alluvial fan deposits not favorable for fossilization and preservation (see above). These deposits tend to be coarse-grained, and represent high-energy depositional environments. Infiltration from infrequent rainfall and runoff is rapid, and deposits are subjected to repeated wetting and drying. The water table lies well below any potential depth of excavation for construction of the project. Previous surface paleontological surveys of the footprint area yielded "no significant paleontological resources" (Corsetti 2009).

Some portions of the footprint area near the northern boundary and Palen Dry Lake do have increased potential for fossilization and *in situ* preservation. These include some parts of the Chuckwalla Sand Corridor (CSC) and Palen Dry Lake playa deposits. Although the bulk of the sand in the CSC was initially deposited prior to *ca.* 5,000 years ago, much has been eroded and re-deposited into dunes and aeolian landforms of relatively modern age (Kenney 2010). Relict dunes and sand sheets comprise parts of the CSC, and these deposits have some potential for fossil content. Late Pleistocene pluvial lakes appear never to have formed in the project footprint area (Nials 2013), but there appears to be a long history of ephemeral playa lakes in Chuckwalla Valley, and Smith recorded more than 600 feet of playa sediments in cores from the Palen Dry Lake basin. Near-shoreline playa and littoral deposits are favorable environments for fossilization and preservation in some situations. Locations where relict aeolian sediments or Palen Dry Lake playa-related deposits potentially lie within 5 feet or less of the surface are quite limited in the project area and are confined to the northern and northeastern boundaries. Older, potentially fossiliferous, Plio-Pleistocene lacustrine/marine/estuarine sediments of the Bouse Formation are extensively present well below the modern surface in most areas of the Colorado River Valley, and outcrop in some mountain ranges north of Chuckwalla Valley. Bouse Formation deposits do not outcrop within the project area, and appear to have been tectonically lowered to several hundreds of feet or more below the modern surface in Chuckwalla Valley and nearby bolsons.

Several practical considerations should be evaluated in assessing the potential damage to significant paleontological resources during construction of the solar generation facility. Heliostat pylons are to be 8 inches in diameter, and will extend into underlying sediments to depths of 4 feet in most areas, and 8 feet in areas of potential scour. The pylons will be vibrated into position, and no recoverable cores or cuttings will be produced. It has been stated that "the site is mantled by at least 1.5 feet of Holocene deposits expected to have a very low yield of vertebrate fossils,

but that Pleistocene sediments *considered to have a high probability of containing fossils* [emphasis added] occur beneath that thin veneer" (Weaver, et al. 2013:1). Two 200-feet long trenches were recently excavated in the power block areas to depths of 4 feet each. Theses trenches exposed Pleistocene alluvial fan sediments at depths varying from 28-40 inches below the existing surface. These sediments are highly oxidized high-energy sediments that have been modified by pedogenesis (soil formation). A zone of calcium carbonate accumulation resulting from pedogenesis is present 6-14 inches below the eroded upper surface of the deposits. The combination of pedogenesis, oxidation, soluble salt movement and precipitation indicate that the Pleistocene sediments have a low probability of vertebrate fossil preservation, in contrast to Weaver et al.'s (2013) suggestion cited above. Examination of the geological and stratigraphic relationships in natural exposures in the general area show that the vast majority of the project area contains fanglomerates at the surface or at shallow depths, and that there are few, if any, locations within the project footprint where "Pleistocene sediments considered to have a high probability of containing fossils" lie within 1.5 feet of the surface.

It was further stated that "the method of pylon construction using vibro-insertion methodology would damage any fossils the pylon encountered without knowing what was being damaged" (Weaver, et al. 2013:1). It is correct to say that fossils could be encountered by the pylons without knowledge of encounter or damage. At first perusal this seems to be an important consideration. Consider, however, the following: emplacement of the 8-inch diameter pylons for the entire field will disturb a total surface area of only1.4 acres. The disturbance over the total area of the project is thus less than 0.04 % of the total facility area. Further, it is conservatively estimated that less than 20 % of the total project area has any possibility of encountering anything other than coarse-grained fanglomerates within a depth of 4-8 feet. Thus, less than 0.01 % of the pylons have any realistic probability of encountering significant fossils. Given the frequency of fossil recovery in the previous paleontological survey, the probability of damaging buried fossil remains is astronomically small.

In conclusion, there are a number of theoretical reasons why one should expect to encounter few significant fossil remains in most of the project area. These considerations, coupled with the observed on-site frequency of fossil remains, suggest that extensive exploration for paleontological resources in most of the proposed Palen footprint is unlikely to be productive, onerously expensive, and time-consuming.

REFERENCES

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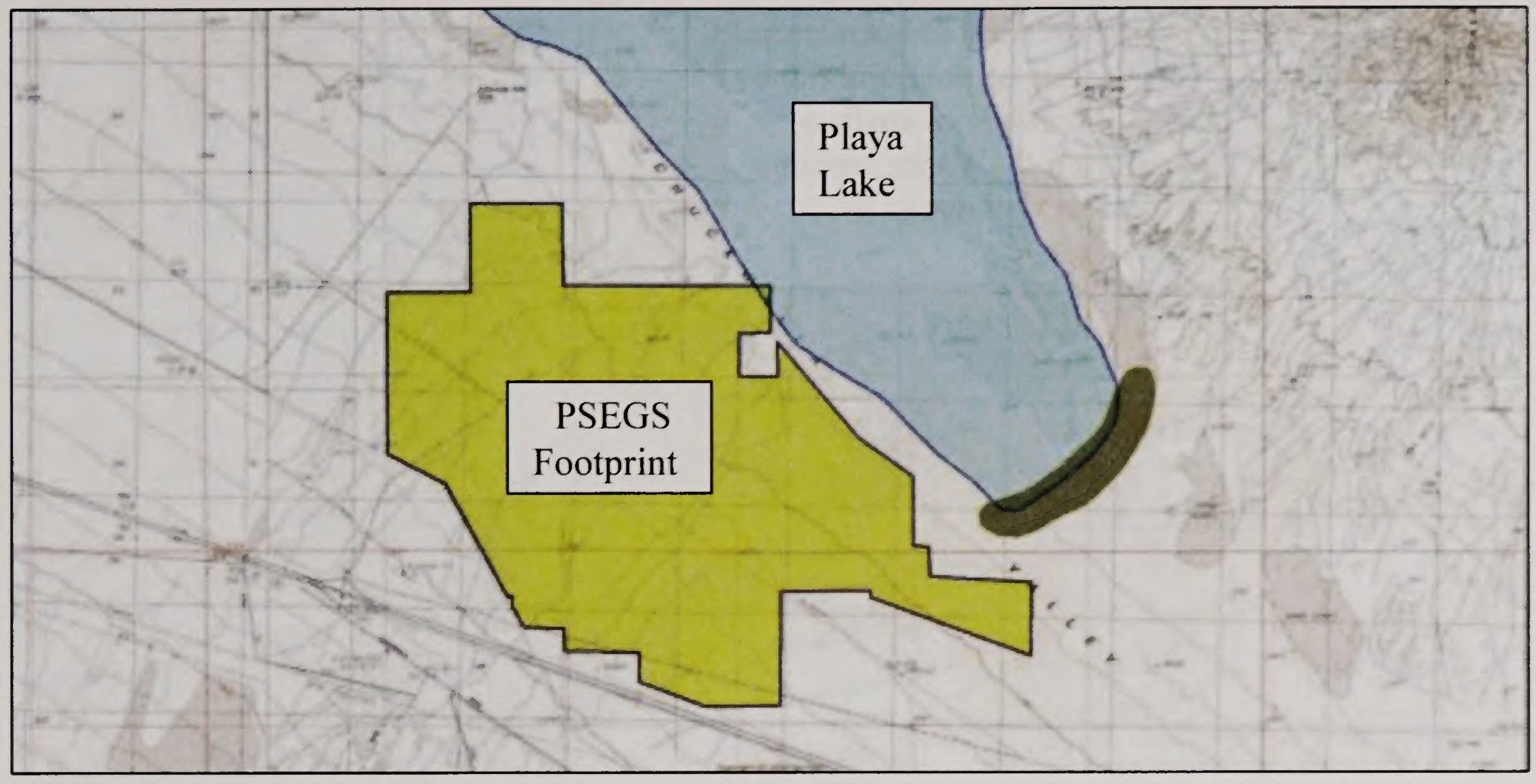


Figure 1. Hypothetical playa lake shown in relation to revised footprint. This assumes a single lake with a surface elevation of approximately 440 feet msl created by dune damming of surface runoff from the Palen Dry Lake drainage basin. Location of the dune dam (shown in green) is hypothetical, but would require a continuous dune accumulation 25 feet high or greater, and water depth within the lake would necessarily be in excess of 15-20 ft. These conditions would favor the formation and preservation of fossils, but there is no evidence of a continuous Mid-Pleistocene or younger playa lake at this or similar level levels in the Palen Dry Lake sub-basin of Chuckwalla Valley.

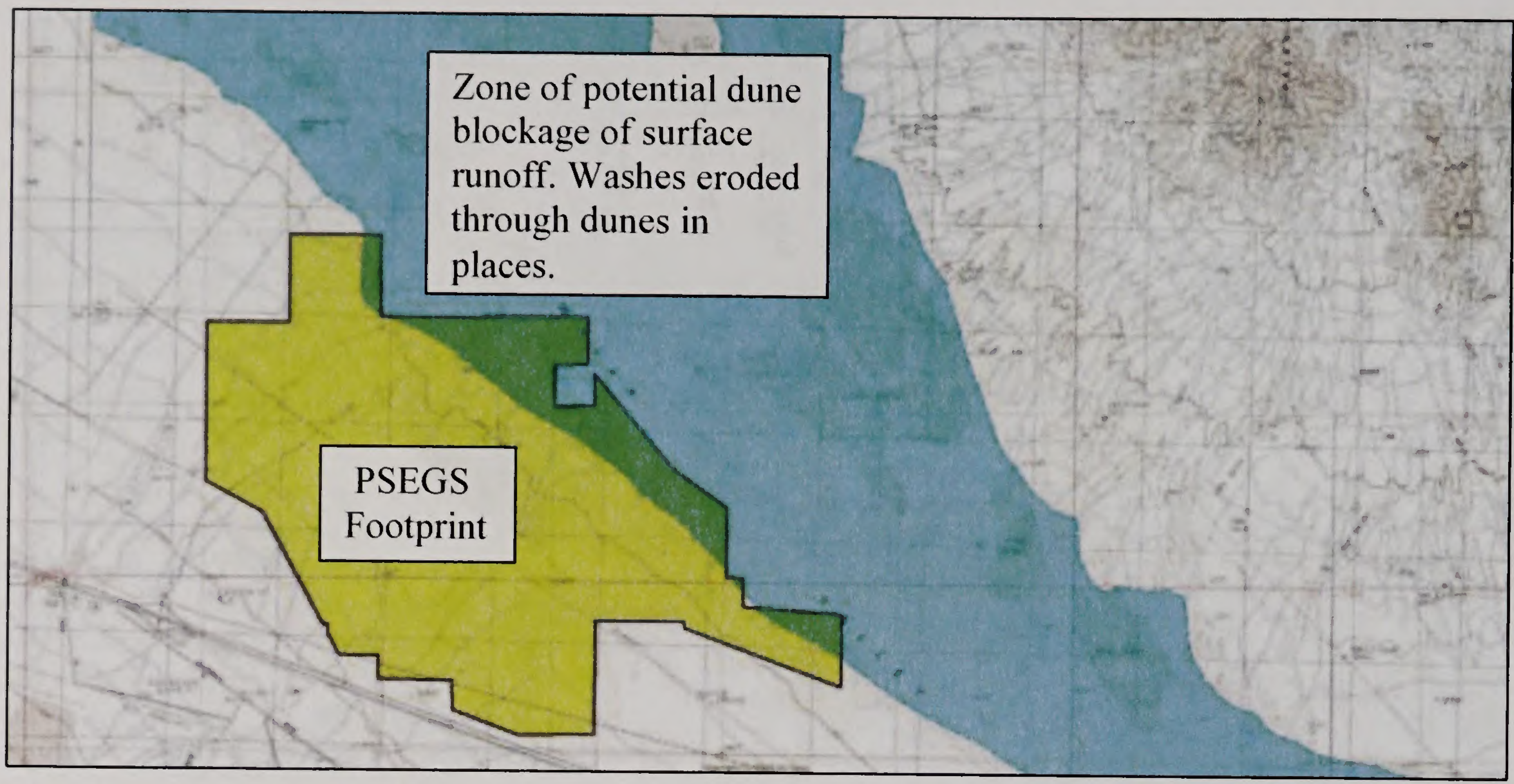


Figure 2. Map showing PSEGS footprint in relation to the distribution of zone (shown in blue) where dunes could potentially have "captured" runoff from adjacent fans at various times in the past to form localized, very ephemeral, shallow impoundments. Ephemeral washes flowing across aeolian landforms within the PSEGS footprint have locally eroded through wind-blown sediments to expose alluvial fan deposits below. Elsewhere in the valley bottom, deflation and erosion by running water expose eroded dune roots and localized playa deposits of late Holocene to Modern age. That portion of the zone that overlaps the PSEGS footprint (shown in green) occupies less than 500 acres.

Appendix D

Section 106 Outreach

Appendix D.1: State Historic Preservation Office and Advisory Council on Historic Preservation Consultations

Appendix D.2: Tribal Consultation Letters

Appendix D.3: Consulting Parties Consultation Letters

Appendix D.1

State Historic Preservation Office and Advisory Council on Historic Preservation Consultations

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Palm Springs-South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262-8001
(760) 833-7100 Fax (760) 833-7199

Visit us on the Internet at
www.blm.gov/ca/palmsprings/

July 21, 2016

In Reply Refer To:
8100 (P)
CAD066.66
CACA 48810

CERTIFIED MAIL #7013 1090 0001 2890 0032
RETURN RECEIPT REQUESTED

Nancy Brown
BLM Liaison/Program Analyst
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington, DC 20001

RE: Proposed EDF-Renewable Energy Palen (EDF-RE) Solar PV project.

Dear Ms. Brown,

The Bureau of Land Management, Palm Springs – South Coast Field Office (BLM) is reviewing a change in technology for the Palen Solar PV Project (proposed Project), proposed by EDF-RE. EDF-RE is planning an approximately 4,200-acre (6.5 sq. mi.) solar photovoltaic energy generation plant project located immediately north of Interstate 10 in the Chuckwalla Valley; 10 miles east of the Community of Desert Center, California; and a short distance south of Palen Dry Lake (Enclosure 1, Proposed Project Location Map). The proposed project is located entirely on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM), and is located within the Riverside East Solar Energy Zone (RESEZ) of BLM's Western Solar Plan, as designated in the Solar PEIS and approved by a Record of Decision signed by the BLM on Friday, October 12, 2012.

The current proposed project is a change in technology from Solar Millennium's previously proposed Palen Solar Power Project (2009), which proposed 25-foot-high solar troughs. The newly proposed Palen Solar PV Project uses photovoltaic cell panels. The proposed Project's transmission line will be approximately 7 miles long, constructed entirely on federal land, and will terminate at the Red Bluff Substation. The solar panel field would occupy an estimated 4,100 acres with an additional 100 acres of supporting parking, administrative areas, access

corridors, construction laydown areas, access roads, and an on-site substation. The proposed output of the facility is 500 MW, and is expected to power roughly 450,000 homes. The proposed Project constitutes an undertaking for purposes of review under Section 106 of the National Historic Preservation Act (NHPA).

Under Federal law, the BLM is responsible for processing Right of Way (ROW) applications on BLM property. In processing the applications, the BLM must comply with the requirements of the National Environmental Policy Act (NEPA), which requires that Federal agencies reviewing projects under their jurisdiction consider the environmental impacts associated with their construction and operation. The BLM will be developing a Draft Supplemental Environmental Impact Statement (EIS) and issuing a new Final EIS. Alternatives will concurrently be analyzed for their potential to affect historic properties as required by Section 106 of the NHPA, and will utilize the public review process described in the NEPA to partially meet public involvement responsibilities under the NHPA. In addition, Section 106 documentation for this proposed Project will be published on the BLM website at: http://www.blm.gov/ca/st/en/fo/cdd.html.

Pursuant to recent guidance from the BLM Washington Office and the Advisory Council on Historic Preservation (ACHP) and Information Bulletin (IB) 2013-020, the Secretary of the Interior's priori renewable energy projects and other major infrastructure projects have the potential to be controversial and complex undertakings and should be processed according to the 36 CFR § 800 Regulations. The BLM would like to invite the participation of the ACHP in the Section 106 compliance process for this undertaking in accordance with 36 CFR 800.2(b)(l).

Specific to Section 106 of the NHPA, the implementing regulation at 36 CFR 800 requires the BLM identify individuals or groups with a demonstrated interest in the undertaking. We request your assistance in identifying any issues or concern you may have about the proposed Project. If you are aware of any other individuals or organizations that should be contacted regarding this proposed Project please let us know. A list of tribes, individuals and organizations receiving this letter is provided for your reference (Enclosure 2).

Identification Efforts

EDF-RE has retained Applied EarthWorks as the primary cultural resources consultant. Applied EarthWorks has access to all of the previous cultural resources studies conducted for both Solar Millennium’s Palen Solar Power Project (2009) and BrightSource Energy’s Palen Solar Electric Generating System (PSEGS) (2012). This research included records searches and literature reviews at the Eastern Information Center (EIC). A total of twelve previously recorded resources were located within a 1-mile radius of the Project area. The resources consisted of five prehistoric archaeological sites (trail, rock ring, ceramic scatter, seasonal camp, and an isolated lithic piece), seven historic period archaeological sites (Chuckwalla Road, four tin can scatters, and two isolated artifacts). None of these resources was recorded within the Project area. These record searches will be supplemented by a review of reports completed since 2012.

BLM Class III archaeological surveys of the proposed Project area have been conducted by AECOM in 2009 and 2010, ECORP in 2010 and AE in 2010. The majority of the proposed Project area has been surveyed. There are 57 resources present within the proposed Project area

including 55 historic-era resources, 1 prehistoric-era resource and 1 multi-component resource. Thirty-two of the historic-era resources are refuse scatters or tank tracks likely associated with the World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA). The remaining 23 historic-era resources include roads, mining claims, section markers, refuse scatters and a corral. The prehistoric resource is a temporary campsite with a hearth feature. The multi-component resource includes both a prehistoric lithic scatter and a historic-era refuse scatter. Any areas within the proposed Project area that have not been surveyed intensively will be surveyed by Applied EarthWorks in the coming months.

In addition, 11 ethnographic resources/Traditional Cultural Properties (TCPs) were identified within 15 miles of the proposed Project. Two of these resources are near but not within the currently proposed Project area. These include: Palen Dunes/Palen Lake TCP and North Chuckwalla Petroglyph District (CA-RIV-01383) TCP.

Finally, geoarchaeological monitoring of a geotechnical investigation within the proposed Project area took place in July 2009 with an absence of cultural resources noted. An additional geoarchaeological study including trench excavations was conducted in 2013. This study concludes that the presence of buried cultural resources within the proposed Project area is unlikely.

A supplemental technical report summarizing the results of the updated record search, the results of the remaining pedestrian survey, and resource eligibility recommendations is forthcoming. Please let us know if you would like to review the report, and we would be happy to send you a copy.

We look forward to hearing from you regarding your interest in the proposed Palen Solar PV Project and our invitation to participate in the Section 106 compliance process for this undertaking in accordance with 36 CFR 800.2(b)(l). If you would like to schedule a separate meeting with the BLM please contact me by telephone at 760-833-7100. You can also contact Jennifer Whyte (BLM Project Manager) at 303-239-3708 or jwhyte@blm.gov or George Kline (BLM Archaeologist) at 760-833-7135 or gkline@blm.gov.

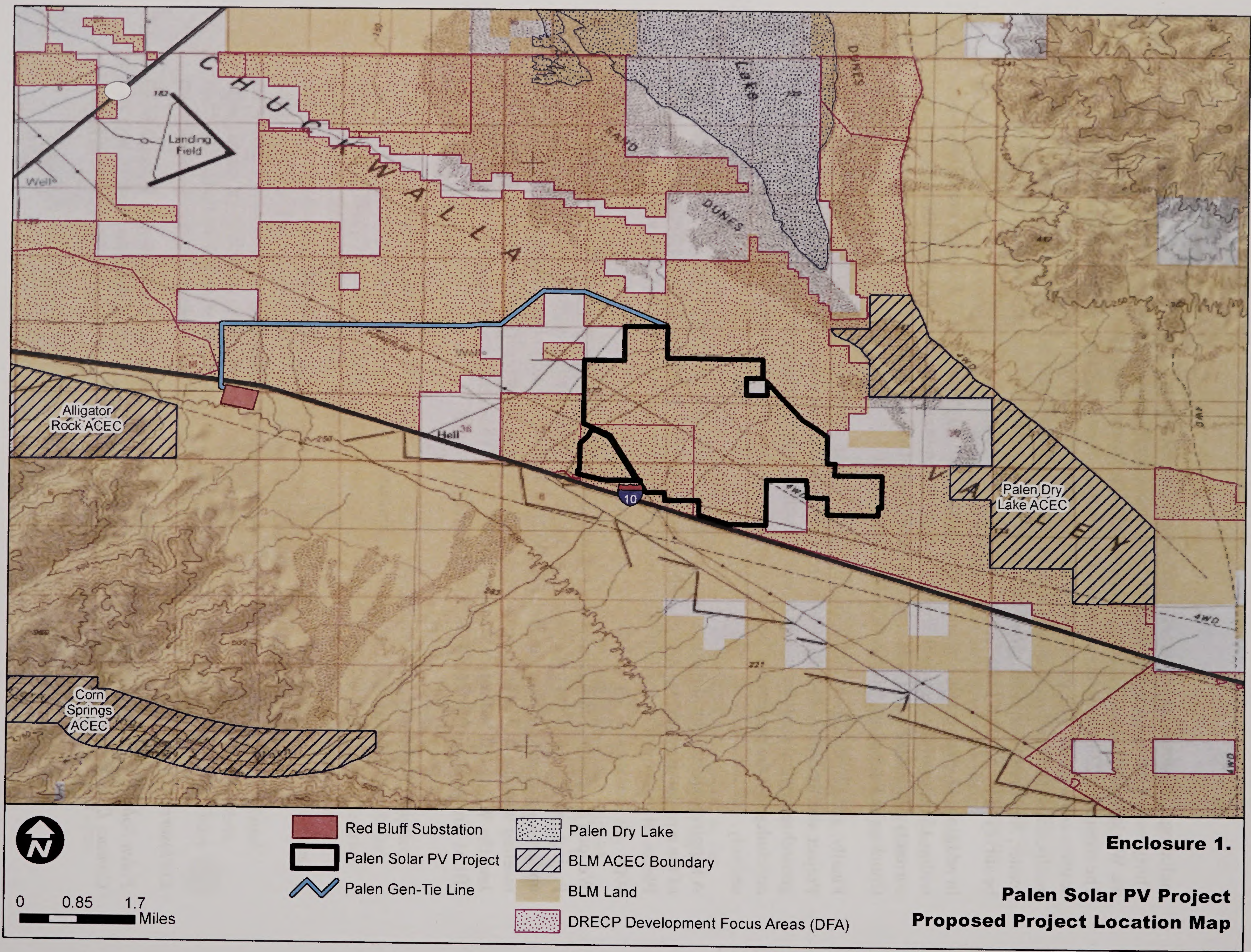
Sincerely,

Vicki L Wood

Vicki L. Wood,
Acting Field Office Manager

Enclosures (2):

Palen Solar PV Project Location Map
Contact Lists for the Proposed EDF-RE Palen Solar PV Project



Enclosure 1.

Palen Solar PV Project
Proposed Project Location Map

BLM Other Organizations Contacts List For EDF-RE Palen Solar Project

Bob Balgenorth, Chairman
California Unions for Reliable Energy

Nancy Brown
BLM Liaison/Program Analyst
Advisory Council on Historic Preservation

Alfredo Figueroa
La Cuna de Atzlan Sacred Sites Protection Circle

Brendon Greenway
Associate State Archaeologist
Office of Historic Preservation

Josh Hoines
Vegetation Branch Chief
Joshua Tree National Park

Anthony Madrigal, Sr.
Director of Policy and Cultural Resources Mgt.
Desert Renewable Energy Tribal Coalition

Michael Pierson, General Manager
General Patton Museum

Bruce Tappeiner, President
Coachella Valley Archaeological Society

Jason Theuer
Cultural Resources Program Manager
Joshua Tree National Park

Heather Thomson
County Archaeologist
Riverside Planning Department

Mark Wheeler, President
Joshua Tree National Park Association

BLM Tribal Contacts List
For EDF-RE Palen Solar Project

Agua Caliente Band of Cahuilla Indians

Jeff Grubbe
Chairman
Agua Caliente Band of Cahuilla Indians

Patricia Garcia
Tribal Historic Preservation Officer
Agua Caliente Band of Cahuilla Indians

Tom Davis
Chief Planning and Development Officer
Agua Caliente Band of Cahuilla Indians

Augustine Band of Cahuilla Indians

Amanda Vance
Chairwoman
Augustine Band of Cahuilla Indians

David Saldivar
Environmental Department
Augustine Band of Cahuilla Indians

Cabazon Band of Mission Indians

Doug Welmas
Chairman
Cabazon Band of Mission Indians

Judy Stapp
Cultural Affairs Director
Cabazon Band of Mission Indians
84-245 Indio Springs Parkway

Cahuilla Band of Mission Indians

Daniel Salgado
Chairman
Cahuilla Band of Mission Indians

Luther Salgado, Jr.
Environmental Director
Cahuilla Band of Mission Indians

Chemehuevi Cultural Center

Charles Wood
Chairman
Chemehuevi Indian Tribe

Dr. Jay Cravath
Chemehuevi Cultural Center
Chemehuevi Indian Tribe

Cocopah Indian Tribe

Sherry Cordova
Chairwoman
Cocopah Indian Tribe

Jill McCormick
Cultural Resources Manager
Cocopah Indian Tribe

Colorado River Indian Tribes

Dennis Patch, Sr
Chairman
Colorado River Indian Tribes

Rebecca Loudbear
Attorney General
Colorado River Indian Tribes

Nancy Jasculca
Deputy Attorney General
Colorado River Indian Tribes

David Harper
Tribal Historic Preservation Officer
Colorado River Indian Tribes

Fort Mojave Indian Tribe

Timothy Williams
Chairman
Fort Mojave Indian Tribe

Linda Otero
AhaMakav Cultural Society
Fort Mojave Indian Tribe
500 Merriman Avenue

Fort Yuma Quechan Tribe

Michael Jackson, Sr.
President
Fort Yuma Quechan Tribe

Manfred Scott
Quechan Cultural Committee
Fort Yuma Quechan Tribe
P.O. Box 1899

Arlene Kingery
Historic Preservation Officer
Fort Yuma Quechan Tribe
P.O. Box 1899

Morongo Band of Mission Indians

Robert Martin
Chairman
Morongo Band of Mission Indians

Pauma Valley Band of Luiseno Indians

Temet A. Aguilar
Tribal Council Chairman
Pauma Valley Band of Luiseno Indians

Ramona Band of Cahuilla Mission Indians

Joseph Hamilton
Tribal Chairman
Ramona Band of Cahuilla Mission Indians

John Gomez
Director, Cultural Resources
Ramona Band of Cahuilla Mission Indians

San Manuel Band of Mission Indians

Lynn Valbuena
Chairwoman
San Manuel Band of Mission Indians

Daniel McCarthy
Cultural Resources Management Department
San Manuel Band of Mission Indians

Ann Brierty
Cultural Resources Field Manager
San Manuel Band of Mission Indians

Soboba Band of Luiseno Indians

Scott Cozart
Chairman
Soboba Band of Luiseno Indians

Joseph Ontiveros
Director, Cultural Resources Department
Soboba Band of Luiseno Indians
P.O. Box 487

Torres Martinez Desert Cahuilla Indians

Mary L. Resvaloso
Chairwoman
Torres Martinez Desert Cahuilla Indians

Twenty-Nine Palms Band of Mission Indians

Darrell Mike
Chairman
Twenty-Nine Palms Band of Mission Indians

Anthony Madrigal, Jr.
Tribal Historic Preservation Officer
Twenty-Nine Palms Band of Mission Indians

From: **Office of Federal Agency Programs** <ofap@achp.gov>
Date: Wed, Aug 10, 2016 at 10:40 AM
Subject: Proposed EDF- Renewable Energy Palen (EDF-RE) Solar PV Project Riverside County, California
To: Vicki Wood <vicki_wood@ca.blm.gov>
Cc: "brendon.greenaway@parks.ca.gov" <brendon.greenaway@parks.ca.gov>, George Kline <george_kline@blm.gov>, Ranel Capron <rcapron@blm.gov>, "soverly@blm.gov" <soverly@blm.gov>, Nancy Brown <nbrown@achp.gov>

From: Office of Federal Agency Programs

Advisory Council on Historic Preservation

Attached is our letter on the subject undertaking (in Adobe Acrobat PDF format)

If you have any questions concerning our letter, please contact

Nancy Brown

202-517-0209

nbrown@achp.gov

Case # 10679

Preserving America's Heritage

August 10, 2016

Ms. Vicki Wood
Field Manager
El Centro Field Office
Bureau of Land Management
1661 South 4th Street
El Centro, CA 92243-4561

Ref: *Proposed EDF- Renewable Energy Palen (EDF-RE) Solar PV Project*
Riverside County, California

Dear Ms. Wood:

On July 26, 2016, the Advisory Council on Historic Preservation (ACHP) received your notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property listed or eligible for listing in the National Register of Historic Places. We understand that we were invited to participate under the Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers regarding the Manner in which BLM will meet its Responsibilities under the National Historic Preservation Act. At this time, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer, affected Indian tribe, or other consulting party, we may reconsider this decision. Additionally, should circumstances change, and you determine that our participation is needed to conclude the consultation process, please notify us.

Pursuant to 36 CFR §800.6(b)(1)(iv), we request that you file the final PROGRAMMATIC AGREEMENT (PA), developed in consultation with the California SHPO and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the PA and supporting documentation with the ACHP completes the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with the opportunity to review this undertaking. If you have any questions or require further assistance of the ACHP, please contact Nancy J. Brown, ACHP's liaison to the BLM, at 202-517-0209 or by e-mail at nbrown@achp.gov.

Sincerely,

Artisha Thompson

Artisha Thompson
Historic Preservation Technician
Office of Federal Agency Programs
Federal Property Management Section

ADVISORY COUNCIL ON HISTORIC PRESERVATION
401 F Street NW, Suite 308 • Washington, DC 20001-2637
Phone: 202-517-0200 • Fax: 202-517-6381 • achp@achp.gov • www.achp.gov

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Palm Springs South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262
www.blm.gov/california

In Reply Refer To:
CAD066 8100 (P)
CACA 48810

MAR 03 2017

CERTIFIED MAIL – 7014 2870 0001 5047 1177
RETURN RECEIPT REQUESTED

Mr. Reid Nelson, Director
Office of Federal Agency Programs
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington, DC 20001-2637

RE: Notification of termination of the Programmatic Agreement for the Palen Solar Project, Riverside County, CA

Dear Mr. Nelson:

The Bureau of Land Management, Palm Springs-South Coast Field Office (BLM) is continuing our consultation with you regarding the Palen Solar Photovoltaic Project (Project), proposed by EDF-Renewable Energy. A Programmatic Agreement[1] (Agreement) to meet the BLM's requirements under Section 106 of the National Historic Preservation Act for two previous solar project proposals (involving the same general area – see Enclosure 1) was executed between the BLM and California State Historic Preservation Officer (SHPO) on October 7, 2010, and amended on November 25, 2013. The BLM notifies you that it has terminated the Agreement (pursuant Stipulation XIII) in consultation with the SHPO, effective February 27, 2017 (Enclosure 2), and will continue reviewing the Project under the Section 106 regulations at 36 CFR 800.4-6.

The BLM reviewed the Agreement based on the current Project description and found that the Agreement would require extensive revision through the amendment process at Stipulation XI to remain legally defensible for reviewing the current Project. The Agreement was originally developed (and amended) for two previous solar project proposals involving technologies, project footprints, and potential direct and indirect effects to historic properties that differ substantially from the current Project. For example, references throughout the Agreement to the involvement of the California Energy Commission (CEC) in project review and approval are no longer applicable. The CEC does not have jurisdiction over the current Project because the proposed technology is photovoltaic rather than heated fluids.

Additionally, Stipulation II of the Agreement contains a detailed two-page description of the Area of Potential Effects (APE) for the Project that defines it essentially as "a 15 mile radius around the block area of the Project." This definition was intended for previous project proposals involving solar trough and solar power tower technologies. The APE description under Stipulation II is no longer applicable

[1] *Programmatic Agreement among the Bureau of Land Management-California, the California Energy Commission, Palen Solar I, LLC, and the California State Historic Preservation Officer, Regarding the Palen Solar Power Project – Riverside County, California.* Executed October 2010, and amended November 2013.

because the solar trough and solar power tower technologies are not part of the current Project proposal and will not be analyzed in the Supplemental Environmental Impact Statement (SEIS).

Furthermore, the BLM has found numerous other provisions of the Agreement including appendices on Coordination with the CEC (Appendix B II), Project Description (Appendix D), and Project Maps and Illustrations (Appendix E) that should either be entirely removed or substantially revised.

On this basis, we consulted with the SHPO to terminate the Agreement, with SHPO agreement on February 27, 2017. The BLM and SHPO believe the best path forward at this point would be for the BLM to continue its review of the Project under the Section 106 regulations at 36 CFR 800.4-6, rather than work with you, the SHPO, and other parties to develop a new programmatic agreement for the Project. Based on our identification and evaluation efforts for two previous applications within the same general application area, and ongoing additional identification and evaluation efforts for the current Project, the BLM and SHPO no longer believe that a phased approach to identification and evaluation is necessary.

The BLM looks forward to continuing our consultation regarding the Project. We are in the process of notifying the Consulting Parties regarding termination of the Agreement and our intent to move forward under 36 CFR 800.4-6. We will continue our consultation with you, as required, if we reach a finding of adverse effect pursuant to 36 CFR 800.6(a)(1).

For information about this notification, please contact James Barnes, Associate State Archaeologist, at (916) 978-4676 or jjbarnes@blm.gov. You can also contact me directly by telephone at (760) 833-7100 or dherrema@blm.gov.

Sincerely,

Janet E. Clark

Douglas J. Herrema, JD
Field Manager

Enclosures (2):

1. Proposed Palen Solar Photovoltaic Project area map
2. Letter dated February 27, 2017 from the SHPO agreeing to terminate the Agreement pursuant to Stipulation XIII

Electronic cc:
Mark DeMaio (mdemaio@blm.gov)
Tiffany Arend (tarend@blm.gov)
Tony Overly (soverly@blm.gov)
George Kline (gkline@blm.gov)

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Palm Springs-South Coast Field Office
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Palm Springs, CA 92262-8001
(760) 833-7100 Fax (760) 833-7199

Visit us on the Internet at
www.blm.gov/ca/palmsprings/

July 21, 2016

In Reply Refer To:
8100 (P)
CAD066.66
CACA 48810

CERTIFIED MAIL #
RETURN RECEIPT REQUESTED

Brendon Greenway
Associate State Archaeologist
Office of Historic Preservation
1725 23rd St Ste 100
Sacramento, A 95816

RE: Proposed EDF-Renewable Energy Palen (EDF-RE) Solar PV project.

Dear Mr.Greenway,

The Bureau of Land Management, Palm Springs – South Coast Field Office (BLM) is reviewing a change in technology for the Palen Solar PV Project (proposed Project), proposed by EDF-RE. EDF-RE is planning an approximately 4,200-acre (6.5 sq. mi.) solar photovoltaic energy generation plant project located immediately north of Interstate 10 in the Chuckwalla Valley; 10 miles east of the Community of Desert Center, California; and a short distance south of Palen Dry Lake (Enclosure 1, Proposed Project Location Map). The proposed project is located entirely on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM), and is located within the Riverside East Solar Energy Zone (RESEZ) of BLM's Western Solar Plan, as designated in the Solar PEIS and approved by a Record of Decision signed by the BLM on Friday, October 12, 2012.

The current proposed project is a change in technology from Solar Millennium's previously proposed Palen Solar Power Project (2009), which proposed 25-foot-high solar troughs. The newly proposed Palen Solar PV Project uses photovoltaic cell panels. The proposed Project's transmission line will be approximately 7 miles long, constructed entirely on federal land, and will terminate at the Red Bluff Substation. The solar panel field would occupy an estimated 4,100 acres with an additional 100 acres of supporting parking, administrative areas, access corridors, construction laydown areas, access roads, and an on-site substation. The proposed output of the facility is 500 MW, and is expected to power roughly 450,000 homes. The

proposed Project constitutes an undertaking for purposes of review under Section 106 of the National Historic Preservation Act (NHPA).

Under Federal law, the BLM is responsible for processing Right Of Way (ROW) applications on BLM property. In processing the applications, the BLM must comply with the requirements of the National Environmental Policy Act (NEPA), which requires that Federal agencies reviewing projects under their jurisdiction consider the environmental impacts associated with their construction and operation. The BLM will be developing a Draft Supplemental Environmental Impact Statement (EIS) and issuing a new Final EIS. Alternatives will concurrently be analyzed for their potential to affect historic properties as required by Section 106 of the NHPA, and will utilize the public review process described in the NEPA to partially meet public involvement responsibilities under the NHPA. In addition, Section 106 documentation for this proposed Project will be published on the BLM website at: http://www.blm.gov/ca/st/en/fo/cdd.html.

We are contacting you at the earliest stages of project review and seeking your views and comments, particularly with regard to any issues that may affect resources that are important to you. This letter serves to provide initial notification of the proposed Project and explain the role of the BLM. The BLM will update you on the Project throughout the review process, unless you have no further interest in this proposed Project.

Specific to Section 106 of the NHPA, the implementing regulation at 36 CFR 800 requires the BLM identify individuals or groups with a demonstrated interest in the undertaking. We request your assistance in identifying any issues or concern you may have about the proposed Project. If you are aware of any other individuals or organizations that should be contacted regarding this proposed Project please let us know. A list of individuals and organizations receiving this letter is provided for your reference (Enclosure 2).

Identification Efforts

EDF-RE has retained Applied EarthWorks as the primary cultural resources consultant. Applied EarthWorks has access to all of the previous cultural resources studies conducted for both Solar Millennium's Palen Solar Power Project (2009) and BrightSource Energy's Palen Solar Electric Generating System (PSEGS) (2012). This research included records searches and literature reviews at the Eastern Information Center (EIC). A total of twelve previously recorded resources were located within a 1-mile radius of the Project area. The resources consisted of five prehistoric archaeological sites (trail, rock ring, ceramic scatter, seasonal camp, and an isolated lithic piece), seven historic period archaeological sites (Chuckwalla Road, four tin can scatters, and two isolated artifacts). None of these resources was recorded within the Project area. These record searches will be supplemented by a review of reports completed since 2012.

BLM Class III archaeological surveys of the proposed Project area have been conducted by AECOM in 2009 and 2010, ECORP in 2010 and AE in 2010. The majority of the proposed Project area has been surveyed. There are 57 resources present within the proposed Project area including 55 historic-era resources, 1 prehistoric-era resource and 1 multi-component resource. Thirty-two of the historic-era resources are refuse scatters or tank tracks likely associated with the World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA). The remaining 23 historic-era resources include roads, mining claims, section markers, refuse scatters and a corral. The prehistoric resource is a temporary campsite with a hearth feature. The

multi-component resource includes both a prehistoric lithic scatter and a historic-era refuse scatter. Any areas within the proposed Project area that have not been surveyed intensively will be surveyed by Applied EarthWorks in the coming months.

In addition, 11 ethnographic resources/Traditional Cultural Properties (TCPs) were identified within 15 miles of the proposed Project. Two of these resources are near but not within the currently proposed Project area. These include: Palen Dunes/Palen Lake TCP and North Chuckwalla Petroglyph District (CA-RIV-01383) TCP.

Finally, geoarchaeological monitoring of a geotechnical investigation within the proposed Project area took place in July 2009 with an absence of cultural resources noted. An additional geoarchaeological study including trench excavations was conducted in 2013. This study concludes that the presence of buried cultural resources within the proposed Project area is unlikely.

A supplemental technical report summarizing the results of the updated record search, the results of the remaining pedestrian survey, and resource eligibility recommendations is forthcoming.

If you would like to be a Consulting Party, know of any other individuals or organizations that should be contacted regarding this proposed Project, or have any questions or concerns about the proposed Project, please contact Jennifer Whyte (BLM Project Manager) at 303-239-3708 or jwhyte@blm.gov. You can also contact George Kline (BLM Archaeologist) at 760-833-7135 or gkline@blm.gov.

We look forward to hearing from you regarding your interest in the proposed Palen Solar PV Project.

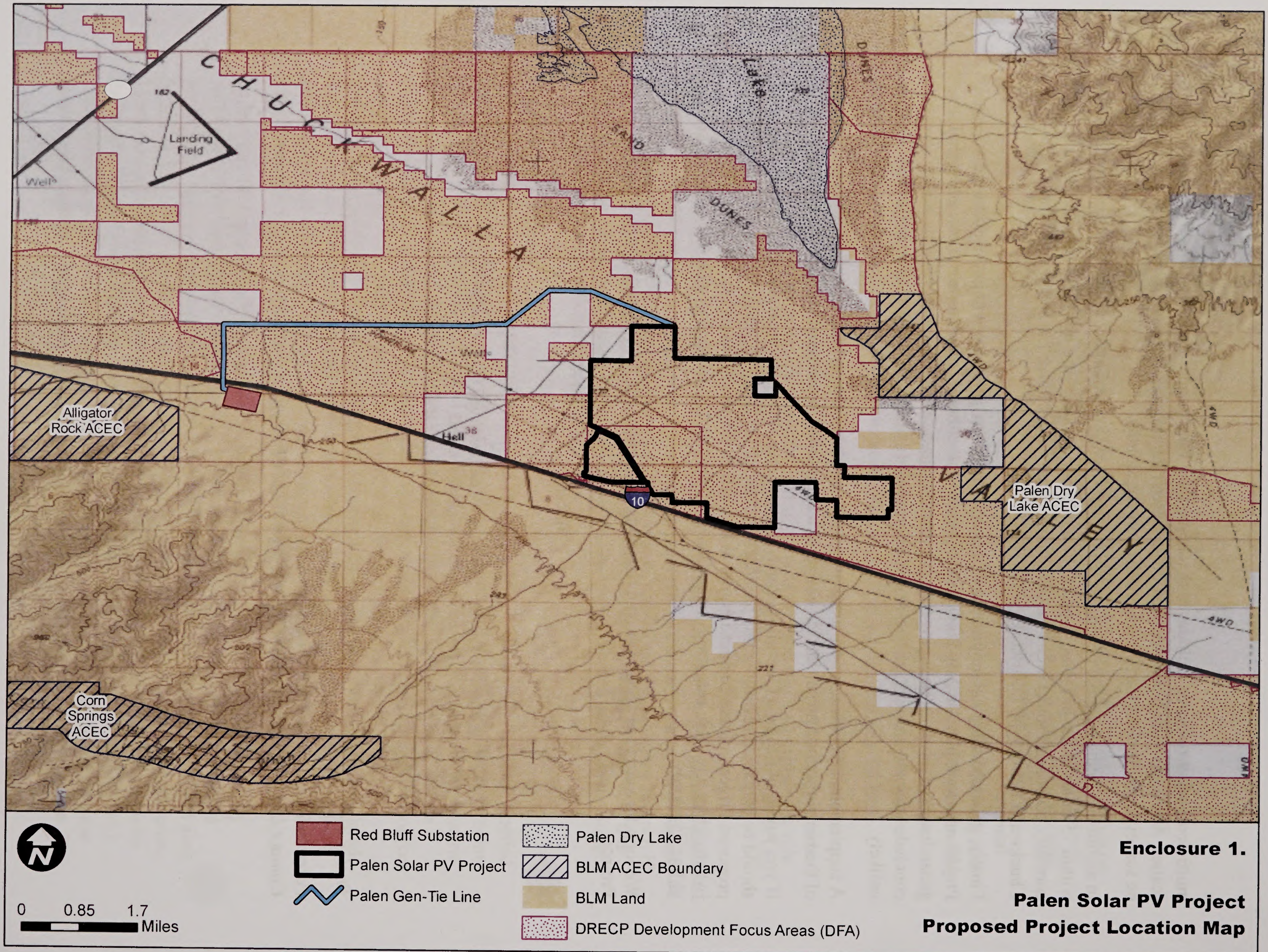
Sincerely,

Vicki L. Wood

Vicki L. Wood,
Acting Field Office Manager

Enclosures (2):

Palen Solar PV Project Location Map
Contact List for the Proposed EDF-RE Palen Solar PV Project



Enclosure 1.

Palen Solar PV Project
Proposed Project Location Map

BLM Other Organizations Contacts List For EDF-RE Palen Solar Project

Bob Balgenorth, Chairman
California Unions for Reliable Energy

Nancy Brown
BLM Liaison/Program Analyst
Advisory Council on Historic Preservation

Alfredo Figueroa
La Cuna de Atzlan Sacred Sites Protection Circle

Brendon Greenway
Associate State Archaeologist
Office of Historic Preservation

Josh Hoines
Vegetation Branch Chief
Joshua Tree National Park

Anthony Madrigal, Sr.
Director of Policy and Cultural Resources Mgt.
Desert Renewable Energy Tribal Coalition

Michael Pierson, General Manager
General Patton Museum

Bruce Tappeiner, President
Coachella Valley Archaeological Society

Jason Theuer
Cultural Resources Program Manager
Joshua Tree National Park

Heather Thomson
County Archaeologist
Riverside Planning Department

Mark Wheeler, President
Joshua Tree National Park Association

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July 21, 2016

In Reply Refer To:
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CERTIFIED MAIL #7013 1090 0001 2890 0018
RETURN RECEIPT REQUESTED

Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

RE: Proposed EDF-Renewable Energy Palen (EDF-RE) Solar PV project.

Dear Ms. Polanco:

The Bureau of Land Management, Palm Springs – South Coast Field Office (BLM) is reviewing a change in technology for the Palen Solar PV Project (proposed Project), proposed by EDF-RE. EDF-RE is planning an approximately 4,200-acre (6.5 sq. mi.) solar photovoltaic energy generation plant project located immediately north of Interstate 10 in the Chuckwalla Valley; 10 miles east of the Community of Desert Center, California; and a short distance south of Palen Dry Lake (Enclosure 1, Proposed Project Location Map). The proposed project is located entirely on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM), and is located within the Riverside East Solar Energy Zone (RESEZ) of BLM's Western Solar Plan, as designated in the Solar PEIS and approved by a Record of Decision signed by the BLM on Friday, October 12, 2012.

The current proposed project is a change in technology from Solar Millennium's previously proposed Palen Solar Power Project (2009), which proposed 25-foot-high solar troughs. The newly proposed Palen Solar PV Project uses photovoltaic cell panels. The proposed Project's transmission line will be approximately 7 miles long, constructed entirely on federal land, and will terminate at the Red Bluff Substation. The solar panel field would occupy an estimated 4,100 acres with an additional 100 acres of supporting parking, administrative areas, access corridors, construction laydown areas, access roads, and an on-site substation. The proposed

output of the facility is 500 MW, and is expected to power roughly 450,000 homes. The proposed Project constitutes an undertaking for purposes of review under Section 106 of the National Historic Preservation Act (NHPA).

Under Federal law, the BLM is responsible for processing Right of Way (ROW) applications on BLM property. In processing the applications, the BLM must comply with the requirements of the National Environmental Policy Act (NEPA), which requires that Federal agencies reviewing projects under their jurisdiction consider the environmental impacts associated with their construction and operation. The BLM will be developing a Draft Supplemental Environmental Impact Statement (EIS) and issuing a new Final EIS. Alternatives will concurrently be analyzed for their potential to affect historic properties as required by Section 106 of the NHPA, and will utilize the public review process described in the NEPA to partially meet public involvement responsibilities under the NHPA. In addition, Section 106 documentation for this proposed Project will be published on the BLM website at: http://www.blm.gov/ca/st/en/fo/cdd.html.

The purpose of this letter is to: 1) notify the State Historic Preservation Office (SHPO) about the proposed Project; and 2) initiate formal consultation on this undertaking with your office and follow the procedures at 36 C.F.R. § 800.

Specific to Section 106 of the NHPA, the implementing regulation at 36 C.F.R. § 800 requires the BLM identify individuals or groups with a demonstrated interest in the undertaking. We request your assistance in identifying any issues or concern you may have about the proposed Project. If you are aware of any other individuals or organizations that should be contacted regarding this proposed Project please let us know. A list of individuals and organizations receiving this letter is provided for your reference (Enclosure 2).

Identification Efforts

EDF-RE has retained Applied EarthWorks as the primary cultural resources consultant. Applied EarthWorks has access to all of the previous cultural resources studies conducted for both Solar Millennium's Palen Solar Power Project (2009) and BrightSource Energy's Palen Solar Electric Generating System (PSEGS) (2012). This research included records searches and literature reviews at the Eastern Information Center (EIC). A total of twelve previously recorded resources were located within a 1-mile radius of the Project area. The resources consisted of five prehistoric archaeological sites (trail, rock ring, ceramic scatter, seasonal camp, and an isolated lithic piece), seven historic period archaeological sites (Chuckwalla Road, four tin can scatters, and two isolated artifacts). None of these resources was recorded within the Project area. These record searches will be supplemented by a review of reports completed since 2012.

BLM Class III archaeological surveys of the proposed Project area have been conducted by AECOM in 2009 and 2010, ECORP in 2010 and AE in 2010. The majority of the proposed Project area has been surveyed. There are 57 resources present within the proposed Project area including 55 historic-era resources, 1 prehistoric-era resource and 1 multi-component resource. Thirty-two of the historic-era resources are refuse scatters or tank tracks likely associated with the World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA).

The remaining 23 historic-era resources include roads, mining claims, section markers, refuse scatters and a corral. The prehistoric resource is a temporary campsite with a hearth feature. The multi-component resource includes both a prehistoric lithic scatter and a historic-era refuse scatter. Any areas within the proposed Project area that have not been surveyed intensively will be surveyed by Applied EarthWorks in the coming months.

In addition, 11 ethnographic resources/Traditional Cultural Properties (TCPs) were identified within 15 miles of the proposed Project. Two of these resources are near but not within the currently proposed Project area. These include: Palen Dunes/Palen Lake TCP and North Chuckwalla Petroglyph District (CA-RIV-01383) TCP.

Finally, geoarchaeological monitoring of a geotechnical investigation within the proposed Project area took place in July 2009 with an absence of cultural resources noted. An additional geoarchaeological study including trench excavations was conducted in 2013. This study concludes that the presence of buried cultural resources within the proposed Project area is unlikely.

A supplemental technical report summarizing the results of the updated record search, the results of the remaining pedestrian survey, and resource eligibility recommendations is forthcoming.

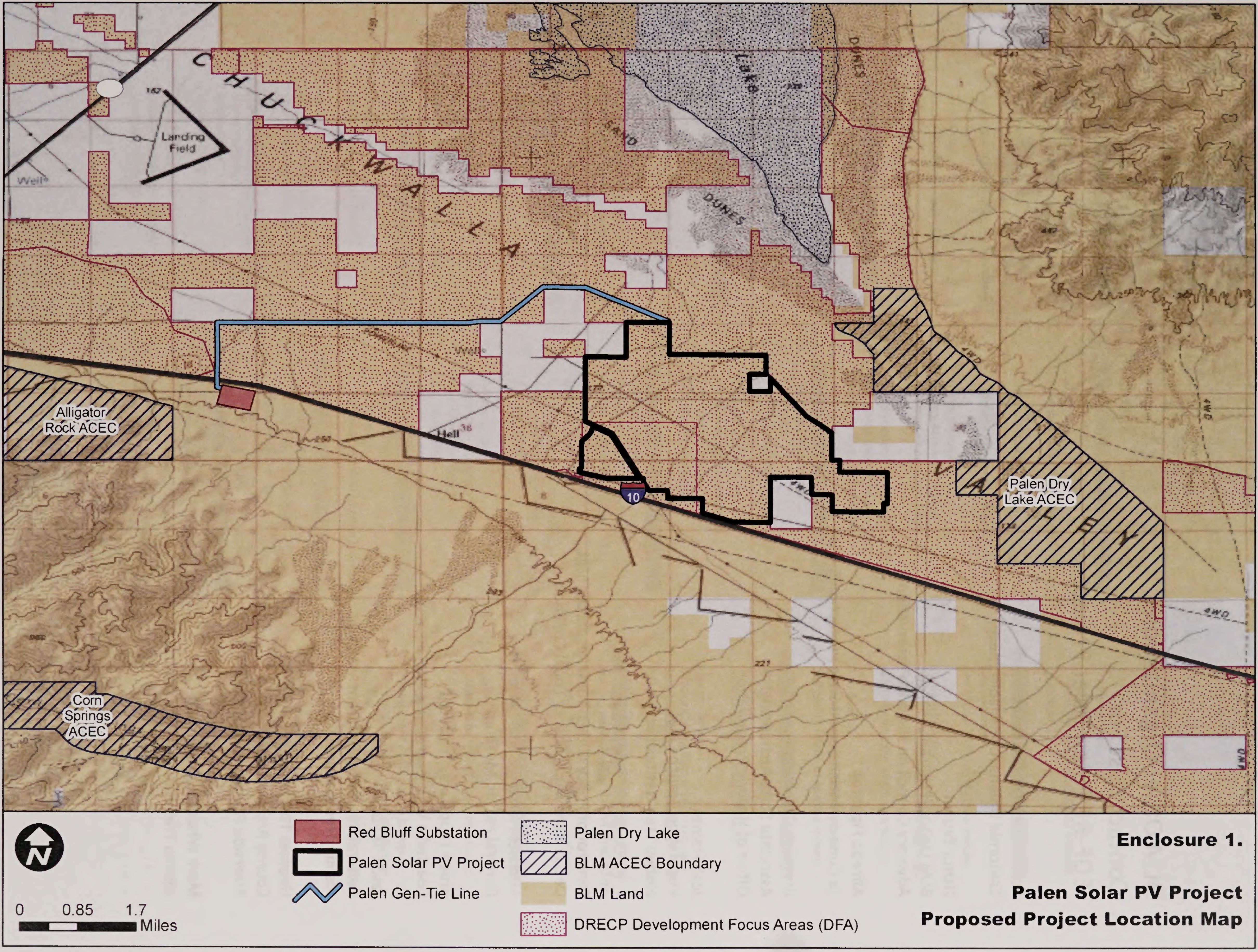
As noted above, the purpose of this letter is to notify your office of the proposed Palen Solar PV Project and to initiate formal consultation on this undertaking with your office in accordance with the 36 C.F.R. § 800 Regulations. If we can provide any information or address any questions regarding this undertaking, please do not hesitate to contact Jennifer Whyte (BLM Project Manager) at 303-239-3708 or jwhyte@blm.gov. You can also contact George Kline (BLM Archaeologist) at 760-833-7135 or gkline@blm.gov. We look forward to your response.

Sincerely,

Vicki L. Wood

Vicki L. Wood,
Acting Field Office Manager

Enclosures (2):
Palen Solar PV Project Location Map
Contact Lists for the Proposed EDF-RE Palen Solar PV Project



Enclosure 1.

Palen Solar PV Project

Proposed Project Location Map

BLM Other Organizations Contacts List For EDF-RE Palen Solar Project

Bob Balgenorth, Chairman
California Unions for Reliable Energy

Nancy Brown
BLM Liaison/Program Analyst
Advisory Council on Historic Preservation

Alfredo Figueroa
La Cuna de Atzlan Sacred Sites Protection Circle

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Jason Theuer
Cultural Resources Program Manager
Joshua Tree National Park

Heather Thomson
County Archaeologist
Riverside Planning Department

Mark Wheeler, President
Joshua Tree National Park Association

BLM Tribal Contacts List
For EDF-RE Palen Solar Project

Agua Caliente Band of Cahuilla Indians

Jeff Grubbe
Chairman
Agua Caliente Band of Cahuilla Indians

Patricia Garcia
Tribal Historic Preservation Officer
Agua Caliente Band of Cahuilla Indians

Tom Davis
Chief Planning and Development Officer
Agua Caliente Band of Cahuilla Indians

Augustine Band of Cahuilla Indians

Amanda Vance
Chairwoman
Augustine Band of Cahuilla Indians

David Saldivar
Environmental Department
Augustine Band of Cahuilla Indians

Cabazon Band of Mission Indians

Doug Welmas
Chairman
Cabazon Band of Mission Indians

Judy Stapp
Cultural Affairs Director
Cabazon Band of Mission Indians
84-245 Indio Springs Parkway

Cahuilla Band of Mission Indians

Daniel Salgado
Chairman
Cahuilla Band of Mission Indians

Luther Salgado, Jr.
Environmental Director
Cahuilla Band of Mission Indians

Chemehuevi Cultural Center

Charles Wood
Chairman
Chemehuevi Indian Tribe

Dr. Jay Cravath
Chemehuevi Cultural Center
Chemehuevi Indian Tribe

Cocopah Indian Tribe

Sherry Cordova
Chairwoman
Cocopah Indian Tribe

Jill McCormick
Cultural Resources Manager
Cocopah Indian Tribe

Colorado River Indian Tribes

Dennis Patch, Sr
Chairman
Colorado River Indian Tribes

Rebecca Loudbear
Attorney General
Colorado River Indian Tribes

Nancy Jasculca
Deputy Attorney General
Colorado River Indian Tribes

David Harper
Tribal Historic Preservation Officer
Colorado River Indian Tribes

Fort Mojave Indian Tribe

Timothy Williams
Chairman
Fort Mojave Indian Tribe

Linda Otero
AhaMakav Cultural Society
Fort Mojave Indian Tribe
500 Merriman Avenue

Fort Yuma Quechan Tribe

Michael Jackson, Sr.
President
Fort Yuma Quechan Tribe

Manfred Scott
Quechan Cultural Committee
Fort Yuma Quechan Tribe
P.O. Box 1899

Arlene Kingery
Historic Preservation Officer
Fort Yuma Quechan Tribe
P.O. Box 1899

Morongo Band of Mission Indians

Robert Martin
Chairman
Morongo Band of Mission Indians

Pauma Valley Band of Luiseno Indians

Temet A. Aguilar
Tribal Council Chairman
Pauma Valley Band of Luiseno Indians

Ramona Band of Cahuilla Mission Indians

Joseph Hamilton
Tribal Chairman
Ramona Band of Cahuilla Mission Indians

John Gomez
Director, Cultural Resources
Ramona Band of Cahuilla Mission Indians

San Manuel Band of Mission Indians

Lynn Valbuena
Chairwoman
San Manuel Band of Mission Indians

Daniel McCarthy
Cultural Resources Management Department
San Manuel Band of Mission Indians

Ann Brierty
Cultural Resources Field Manager
San Manuel Band of Mission Indians

Soboba Band of Luiseno Indians

Scott Cozart
Chairman
Soboba Band of Luiseno Indians

Joseph Ontiveros
Director, Cultural Resources Department
Soboba Band of Luiseno Indians
P.O. Box 487

Torres Martinez Desert Cahuilla Indians

Mary L. Resvaloso
Chairwoman
Torres Martinez Desert Cahuilla Indians

Twenty-Nine Palms Band of Mission Indians

Darrell Mike
Chairman
Twenty-Nine Palms Band of Mission Indians

Anthony Madrigal, Jr.
Tribal Historic Preservation Officer
Twenty-Nine Palms Band of Mission Indians

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September 21, 2016

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CERTIFIED MAIL # 7016 0600 0000 2904 3037
RETURN RECEIPT REQUESTED

Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

RE: Proposed APE, Identification Efforts, and Work Plan for the EDF-Renewable Energy Palen (EDF-RE) Solar PV project.

Dear Ms. Polanco,

The Bureau of Land Management, Palm Springs – South Coast Field Office (BLM) is reviewing an application for a right-of-way (ROW) grant and proposed change in technology for the Palen Solar PV Project (proposed Project), submitted by EDF Renewable Energy (EDF-RE). The proposed Project includes the construction, operation and maintenance of a 500 megawatt (MW) photovoltaic (PV) solar electrical generating facility encompassing 4,200 acres (6.5 sq. mi.) and approximately 7 miles of transmission line located entirely on public lands managed by the BLM within the Riverside East Solar Energy Zone (RESEZ) of BLM's Western Solar Plan, as designated in the Solar PEIS and approved by a Record of Decision (ROD) signed by the BLM on Friday, October 12, 2012. The proposed facility would terminate at the Red Bluff Substation, and proposes use of PV cell panels rather than the previously proposed 25-foot-high solar troughs included in the Palen Solar Power Project (2009). The proposed Project is located immediately north of Interstate 10 in the Chuckwalla Valley, 10 miles east of the Community of Desert Center, California, and a short distance south of Palen Dry Lake (Enclosure 1, Figure 1).

Under Federal law, the BLM is responsible for processing ROW applications for facilities proposed to be constructed and operated on public lands. In processing the applications, the BLM must comply with the requirements of the National Environmental Policy Act (NEPA), which requires that Federal agencies reviewing projects under their jurisdiction consider the environmental impacts associated with their construction and operation. The BLM is presently

initiating the NEPA stages of this proposed Project. The Project also constitutes an undertaking for purposes of review under Section 106 of the National Historic Preservation Act (NHPA). The BLM is the Federal agency for the preparation of the environmental documents in compliance with the requirements of NEPA, the Council on Environmental Quality (CEQ) regulation for implementing NEPA (40 Code of Federal Regulations [C.F.R.] 1500 – 1508), and the BLM NEPA guidance handbook (H-1790-1). The BLM will be developing an Environmental Impact Statement (EIS) for the proposed Project in compliance with the NEPA. Alternatives will concurrently be analyzed for their potential to affect historic properties as required by Section 106 of the NHPA, and we will utilize the NEPA public review process to partially meet our public involvement responsibilities under the NHPA.

The purpose of this letter is to submit the agency's Area of Potential Effects (APE) determination, scope of identification efforts for consultation, and work plan for a 30-calendar day period of review pursuant to 36 C.F.R. § 800.4(a)(1).

Initiation of the Section 106 Process
Specific to Section 106 of the NHPA, the implementing regulation at 36 C.F.R. § 800 requires the BLM to consult with Indian tribes that attach religious or cultural significance to historic properties that may be affected by an undertaking, as well as to involve the public and identify other consulting parties. The BLM notified Indian tribes and other interested parties about the proposed undertaking on July 21-22, 2016 and invited them to be consulting parties. Tribes and other interested parties were also invited to public workshops hosted by BLM in Palm Springs, California, on June 29, 2016 and August 4, 2016 (Enclosures 2 and 3).

Sixteen federally recognized Indian tribes have been identified and have been invited to consult on the proposed Project. These include the Agua Caliente Band of Cahuilla Indians, Augustine Band of Cahuilla Indians, Cabazon Band of Mission Indians, Cahuilla Band of Mission Indians, Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Fort Yuma Quechan Tribe, Morongo Band of Mission Indians, Pauma Valley Band of Luiseño Indians, Ramona Band of Cahuilla Mission Indians, San Manuel Band of Mission Indians, Soboba Band of Luiseño Indians, Torres Martinez Desert Cahuilla Indians, and the Twenty-Nine Palms Band of Mission Indians. Of these, NHPA Section 106 government-to-government consultation has begun with representatives of the Agua Caliente Band of Cahuilla Indians, Colorado River Indian Tribes, Fort Yuma Quechan Tribe, and the Soboba Band of Luiseño Indians.

The BLM also notified the Advisory Council on Historic Preservation (ACHP) about this proposed undertaking on July 21, 2016. The ACHP declined to participate in the project in a letter dated August 1, 2016.

Direct and Indirect APE
The BLM has defined the APE for the agency undertaking based on the submitted proposed Project design and an assessment of the local terrain characteristics, which were factors considered in establishing an APE for previously proposed solar energy projects near the location. Information provided by Tribes was also considered (see Enclosure 2). For the proposed Project site, the APE will include the entirety of the Project land for which the

Applicant seeks a permit, plus a 30-foot buffer surrounding the entire Project. This includes 4,100 acres with an additional 100 acres of supporting parking, administrative areas, access corridors, construction laydown areas, access roads, and an on-site substation. For the gen-tie corridor, the APE will include 300 feet on both sides of the centerline, with an expanded radius of 600 feet at proposed pull sites.

The APE for indirect effects is dictated largely by the distance from which the facility can be seen. For consideration of potential indirect effects to historic properties, the APE is expanded to a five-mile radius, beyond the Project site and the gen-tie. The indirect effects APE is bounded to the southeast by the Chuckwalla Mountains and includes a portion of the Palen Dry Lake ACEC to the east. Both the direct and indirect APEs are shown in Enclosure 1 (Figures 1, 2 and 3).

Proposed Scope of Identification Efforts

EDF-RE has contracted with Applied EarthWorks (Æ) to conduct all cultural resources studies associated with the proposed Project. Æ has access to all of the previous cultural resources studies conducted for both Solar Millennium's Palen Solar Power Project (PSPP) (2009) and BrightSource Energy's Palen Solar Electric Generating System (PSEGS) (2012). This research included records searches and literature reviews at the Eastern Information Center (EIC). A total of twelve previously recorded resources were located within a 1-mile radius of the proposed Project area. The resources consisted of five prehistoric archaeological sites (trail, rock ring, ceramic scatter, seasonal camp, and an isolated lithic) and seven historic period archaeological sites (Chuckwalla Road, four tin can scatters, and two isolated artifacts). None of these resources are located within the direct APE of the proposed Project area. BLM Class III archaeological surveys of the proposed Project area have been conducted by AECOM in 2009 and 2010, ECORP in 2010, and Æ in 2010.

Based on the review of the aforementioned reports, the majority (~ 94%) of the proposed Project area has been surveyed. There are 57 resources present within the proposed Project's direct and indirect area, including 55 historic-era resources, 1 prehistoric-era resource and 1 multi-component resource. Two prehistoric resources and 35 historic resources are located within the proposed Project's direct APE. In addition, extensive interviews with tribal members were conducted as part of the Palen Solar Electric Generating System (PSEGS) Project. As a result of these interviews, several cultural landscapes and 11 Traditional Cultural Properties were identified.

Based on the previous work completed within the project area, the following resource identification efforts are proposed for this project:

- A Class I record search was prepared in 2009. A supplement to this report will be prepared that reviews any new studies completed since 2009, including those that are encompassed in the 1-mile buffer zone surrounding the direct APE.
- Conduct a Class III pedestrian survey of the remaining unsurveyed 236.95 acres of the direct APE, and re-survey any areas in the Northeastern corner of the APE that may be identified by a professional hydrologist as being at high risk for adverse site impacts due to natural erosion or weathering caused by recent storm events (see Enclosure 1, Figure 4).

- As part of the Class III effort, re-visit historic resources that were provisionally regarded as ineligible in the AECOM 2009 study in order to re-evaluate them as potentially contributing elements of the World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-A MA). CA DPR 523 forms will be updated as needed.
- Conduct site visits and complete updates to CA DPR 523 forms for eight prehistoric sites located within the proposed Project area in order to document the condition of these resources and evaluate their eligibility to the NRHP, particularly those that may contribute to the DTC/C-A MA. These include sites SMP-P-1015, -1016, -1017, -1018, -1019A, -1019B, -2013A, and -2013B, as well as any other resources that may be identified during consultation, or that were identified in recent ethnographic interviews.
- Conduct limited testing of SMP-P-2015 and SMP-P-2023 located within the proposed Project's direct APE to determine whether these resources are eligible for inclusion in the NRHP under Criterion D (i.e., *have yielded, or may be likely to yield, information important in prehistory or history* [36 C.F.R. 60.4]). (Site SMP-P-2015 is a scatter of ground stone and flaked stone artifacts on a low northeast-sloping stabilized dune. A fragment of marine shell was also observed during documentation of the site. Site SMP-P-2023 is a temporary camp site with flaked stone and ground stone artifacts. A discrete scatter of fire-altered rock representing the remains of a possible hearth was observed in the center of the site).
- Write an ethnographic literature review using existing information. Since ethnographic interviews were conducted in 2009 in order to identify sensitive resources in the Chuckwalla Valley, no additional interviews are proposed.

As noted above, the purpose of this letter is to notify your office of the proposed Palen Solar Project, initiate formal consultation on this undertaking with your office in accordance with 36 C.F.R. § 800 Regulations, and to submit the BLM's APE determination, scope of identification for consultation, and work plan pursuant to 36 C.F.R. § 800.4(a)(1).

We appreciate your attention to our request and look forward to consulting on the proposed undertaking. If we can provide any information or address any questions regarding this undertaking, please do not hesitate to contact Jennifer Whyte (BLM Project Manager) at (303) 239-3708 or jwhyte@blm.gov. You can also contact George Kline (BLM Archaeologist) at (760) 833-7135 or gkline@blm.gov.

Sincerely,

Vicki L Wood

Vicki L. Wood
Acting Field Manager

Enclosures:

1- *Work Plan with Figures*
2- *Tribal Contacts List*
3- *Other Organizations Contacts List (Updated)*

CC: Brendon Greenway, Associate State Archaeologist, OHP

BLM Tribal Contacts List
For EDF-RE Palen Solar Project

Agua Caliente Band of Cahuilla Indians

The Honorable Jeff Grubbe,
Chairman
Agua Caliente Band of Cahuilla Indians

Patricia Garcia
Tribal Historic Preservation Officer
Agua Caliente Band of Cahuilla Indians

Tom Davis
Chief Planning and Development Officer
Agua Caliente Band of Cahuilla Indians

Augustine Band of Cahuilla Indians

The Honorable Amanda Vance,
Chairwoman
Augustine Band of Cahuilla Indians

David Saldivar
Environmental Department
Augustine Band of Cahuilla Indians

Cabazon Band of Mission Indians

The Honorable Doug Welmas,
Chairman
Cabazon Band of Mission Indians

Judy Stapp
Cultural Affairs Director
Cabazon Band of Mission Indians

Cahuilla Band of Mission Indians

The Honorable Daniel Salgado,
Chairman
Cahuilla Band of Mission Indians

Luther Salgado, Jr.
Environmental Director
Cahuilla Band of Mission Indians

Chemehuevi Cultural Center

The Honorable Charles Wood,
Chairman
Chemehuevi Indian Tribe

Dr. Jay Cravath
Chemehuevi Cultural Center
Chemehuevi Indian Tribe

Cocopah Indian Tribe

The Honorable Sherry Cordova,
Chairwoman
Cocopah Indian Tribe

Jill McCormick
Cultural Resources Manager
Cocopah Indian Tribe

Colorado River Indian Tribes

The Honorable Dennis Patch Sr. ,
Chairman
Colorado River Indian Tribes

Rebecca Loudbear
Attorney General
Colorado River Indian Tribes

Nancy Jasculca
Deputy Attorney General
Colorado River Indian Tribes

David Harper
Tribal Historic Preservation Officer
Colorado River Indian Tribes

Fort Mojave Indian Tribe

The Honorable Timothy Williams,
Chairman
Fort Mojave Indian Tribe

Linda Otero
Aha Makav Cultural Society
Fort Mojave Indian Tribe
500 Merriman Avenue

Fort Yuma Quechan Tribe

Michael Jackson, Sr.
President
Fort Yuma Quechan Tribe

Manfred Scott
Quechan Cultural Committee
Fort Yuma Quechan Tribe

Arlene Kingery
Historic Preservation Officer
Fort Yuma Quechan Tribe

Morongo Band of Mission Indians

The Honorable Robert Martin,
Chairman
Morongo Band of Mission Indians

Pauma Valley Band of Luiseño Indians

The Honorable Temet A. Aguilar,
Tribal Council Chairman
Pauma Valley Band of Luiseño Indians

Ramona Band of Cahuilla Mission Indians

The Honorable Joseph Hamilton,
Tribal Chairman
Ramona Band of Cahuilla Mission Indians

John Gomez
Director, Cultural Resources
Ramona Band of Cahuilla Mission Indians

San Manuel Band of Mission Indians

The Honorable Lynn Valbuena,
Chairwoman
San Manuel Band of Mission Indians

Daniel McCarthy
Cultural Resources Management Department
San Manuel Band of Mission Indians

Ann Brierty
Cultural Resources Field Manager
San Manuel Band of Mission Indians

Soboba Band of Luiseño Indians

The Honorable Scott Cozart,
Chairman
Soboba Band of Luiseño Indians

Joseph Ontiveros
Director, Cultural Resources Department
Soboba Band of Luiseño Indians

Torres Martinez Desert Cahuilla Indians

The Honorable Mary L. Resvaloso,
Chairwoman
Torres Martinez Desert Cahuilla Indians

Twenty-Nine Palms Band of Mission Indians

The Honorable Darrell Mike,
Chairman
Twenty-Nine Palms Band of Mission Indians

Anthony Madrigal, Jr.
Tribal Historic Preservation Officer
Twenty-Nine Palms Band of Mission Indians

BLM Other Organizations Contacts List For EDF-RE Palen Solar Project

Nancy Brown
BLM Liaison/Program Analyst
Advisory Council on Historic Preservation

Bob Balgenorth, Chairman
California Unions for Reliable Energy

Bruce Tappeiner
President
Coachella Valley Archaeological Society

Anthony Madrigal, Sr.
Director of Policy and Cultural Resources Mgt.
Desert Renewable Energy Tribal Coalition

Michael Pierson
General Manager
General Patton Museum

Jason Theuer
Cultural Resources Program Manager
Joshua Tree National Park

Josh Hoines
Vegetation Branch Chief
Joshua Tree National Park

Mark Wheeler
President
Joshua Tree National Park Association

Alfredo Figueroa
La Cuna de Atzlan Sacred Sites Protection Circle

Brendon Greenway
Associate State Archaeologist
Office of Historic Preservation

Heather Thomson
County Archaeologist
Riverside Planning Department

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Palm Springs-South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262-8001
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September 21, 2016

In Reply Refer To:
8100 (P)
CAD066.66
CACA 48810

CERTIFIED MAIL # 7016 0600 0000 2904 3037
RETURN RECEIPT REQUESTED

Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

RE: Proposed APE, Identification Efforts, and Work Plan for the EDF-Renewable Energy Palen (EDF-RE) Solar PV project.

Dear Ms. Polanco,
The Bureau of Land Management, Palm Springs – South Coast Field Office (BLM) is reviewing an application for a right-of-way (ROW) grant and proposed change in technology for the Palen Solar PV Project (proposed Project), submitted by EDF Renewable Energy (EDF-RE). The proposed Project includes the construction, operation and maintenance of a 500 megawatt (MW) photovoltaic (PV) solar electrical generating facility encompassing 4,200 acres (6.5 sq. mi.) and approximately 7 miles of transmission line located entirely on public lands managed by the BLM within the Riverside East Solar Energy Zone (RESEZ) of BLM's Western Solar Plan, as designated in the Solar PEIS and approved by a Record of Decision (ROD) signed by the BLM on Friday, October 12, 2012. The proposed facility would terminate at the Red Bluff Substation, and proposes use of PV cell panels rather than the previously proposed 25-foot-high solar troughs included in the Palen Solar Power Project (2009). The proposed Project is located immediately north of Interstate 10 in the Chuckwalla Valley, 10 miles east of the Community of Desert Center, California, and a short distance south of Palen Dry Lake (Enclosure 1, Figure 1).

Under Federal law, the BLM is responsible for processing ROW applications for facilities proposed to be constructed and operated on public lands. In processing the applications, the BLM must comply with the requirements of the National Environmental Policy Act (NEPA), which requires that Federal agencies reviewing projects under their jurisdiction consider the environmental impacts associated with their construction and operation. The BLM is presently

initiating the NEPA stages of this proposed Project. The Project also constitutes an undertaking for purposes of review under Section 106 of the National Historic Preservation Act (NHPA). The BLM is the Federal agency for the preparation of the environmental documents in compliance with the requirements of NEPA, the Council on Environmental Quality (CEQ) regulation for implementing NEPA (40 Code of Federal Regulations [C.F.R.] 1500 – 1508), and the BLM NEPA guidance handbook (H-1790-1). The BLM will be developing an Environmental Impact Statement (EIS) for the proposed Project in compliance with the NEPA. Alternatives will concurrently be analyzed for their potential to affect historic properties as required by Section 106 of the NHPA, and we will utilize the NEPA public review process to partially meet our public involvement responsibilities under the NHPA.

The purpose of this letter is to submit the agency's Area of Potential Effects (APE) determination, scope of identification efforts for consultation, and work plan for a 30-calendar day period of review pursuant to 36 C.F.R. § 800.4(a)(1).

Initiation of the Section 106 Process
Specific to Section 106 of the NHPA, the implementing regulation at 36 C.F.R. § 800 requires the BLM to consult with Indian tribes that attach religious or cultural significance to historic properties that may be affected by an undertaking, as well as to involve the public and identify other consulting parties. The BLM notified Indian tribes and other interested parties about the proposed undertaking on July 21-22, 2016 and invited them to be consulting parties. Tribes and other interested parties were also invited to public workshops hosted by BLM in Palm Springs, California, on June 29, 2016 and August 4, 2016 (Enclosures 2 and 3).

Sixteen federally recognized Indian tribes have been identified and have been invited to consult on the proposed Project. These include the Agua Caliente Band of Cahuilla Indians, Augustine Band of Cahuilla Indians, Cabazon Band of Mission Indians, Cahuilla Band of Mission Indians, Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Fort Yuma Quechan Tribe, Morongo Band of Mission Indians, Pauma Valley Band of Luiseño Indians, Ramona Band of Cahuilla Mission Indians, San Manuel Band of Mission Indians, Soboba Band of Luiseño Indians, Torres Martinez Desert Cahuilla Indians, and the Twenty-Nine Palms Band of Mission Indians. Of these, NHPA Section 106 government-to-government consultation has begun with representatives of the Agua Caliente Band of Cahuilla Indians, Colorado River Indian Tribes, Fort Yuma Quechan Tribe, and the Soboba Band of Luiseño Indians.

The BLM also notified the Advisory Council on Historic Preservation (ACHP) about this proposed undertaking on July 21, 2016. The ACHP declined to participate in the project in a letter dated August 1, 2016.

Direct and Indirect APE
The BLM has defined the APE for the agency undertaking based on the submitted proposed Project design and an assessment of the local terrain characteristics, which were factors considered in establishing an APE for previously proposed solar energy projects near the location. Information provided by Tribes was also considered (see Enclosure 2). For the proposed Project site, the APE will include the entirety of the Project land for which the

Applicant seeks a permit, plus a 30-foot buffer surrounding the entire Project. This includes 4,100 acres with an additional 100 acres of supporting parking, administrative areas, access corridors, construction laydown areas, access roads, and an on-site substation. For the gen-tie corridor, the APE will include 300 feet on both sides of the centerline, with an expanded radius of 600 feet at proposed pull sites.

The APE for indirect effects is dictated largely by the distance from which the facility can be seen. For consideration of potential indirect effects to historic properties, the APE is expanded to a five-mile radius, beyond the Project site and the gen-tie. The indirect effects APE is bounded to the southeast by the Chuckwalla Mountains and includes a portion of the Palen Dry Lake ACEC to the east. Both the direct and indirect APEs are shown in Enclosure 1 (Figures 1, 2 and 3).

Proposed Scope of Identification Efforts

EDF-RE has contracted with Applied EarthWorks (Æ) to conduct all cultural resources studies associated with the proposed Project. Æ has access to all of the previous cultural resources studies conducted for both Solar Millennium's Palen Solar Power Project (PSPP) (2009) and BrightSource Energy's Palen Solar Electric Generating System (PSEGS) (2012). This research included records searches and literature reviews at the Eastern Information Center (EIC). A total of twelve previously recorded resources were located within a 1-mile radius of the proposed Project area. The resources consisted of five prehistoric archaeological sites (trail, rock ring, ceramic scatter, seasonal camp, and an isolated lithic) and seven historic period archaeological sites (Chuckwalla Road, four tin can scatters, and two isolated artifacts). None of these resources are located within the direct APE of the proposed Project area. BLM Class III archaeological surveys of the proposed Project area have been conducted by AECOM in 2009 and 2010, ECORP in 2010, and Æ in 2010.

Based on the review of the aforementioned reports, the majority (~ 94%) of the proposed Project area has been surveyed. There are 57 resources present within the proposed Project's direct and indirect area, including 55 historic-era resources, 1 prehistoric-era resource and 1 multi-component resource. Two prehistoric resources and 35 historic resources are located within the proposed Project's direct APE. In addition, extensive interviews with tribal members were conducted as part of the Palen Solar Electric Generating System (PSEGS) Project. As a result of these interviews, several cultural landscapes and 11 Traditional Cultural Properties were identified.

Based on the previous work completed within the project area, the following resource identification efforts are proposed for this project:

- A Class I record search was prepared in 2009. A supplement to this report will be prepared that reviews any new studies completed since 2009, including those that are encompassed in the 1-mile buffer zone surrounding the direct APE.
- Conduct a Class III pedestrian survey of the remaining unsurveyed 236.95 acres of the direct APE, and re-survey any areas in the Northeastern corner of the APE that may be identified by a professional hydrologist as being at high risk for adverse site impacts due to natural erosion or weathering caused by recent storm events (see Enclosure 1, Figure 4).

- As part of the Class III effort, re-visit historic resources that were provisionally regarded as ineligible in the AECOM 2009 study in order to re-evaluate them as potentially contributing elements of the World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-A MA). CA DPR 523 forms will be updated as needed.
- Conduct site visits and complete updates to CA DPR 523 forms for eight prehistoric sites located within the proposed Project area in order to document the condition of these resources and evaluate their eligibility to the NRHP, particularly those that may contribute to the DTC/C-A MA. These include sites SMP-P-1015, -1016, -1017, -1018, -1019A, -1019B, -2013A, and -2013B, as well as any other resources that may be identified during consultation, or that were identified in recent ethnographic interviews.
- Conduct limited testing of SMP-P-2015 and SMP-P-2023 located within the proposed Project's direct APE to determine whether these resources are eligible for inclusion in the NRHP under Criterion D (i.e., *have yielded, or may be likely to yield, information important in prehistory or history* [36 C.F.R. 60.4]). (Site SMP-P-2015 is a scatter of ground stone and flaked stone artifacts on a low northeast-sloping stabilized dune. A fragment of marine shell was also observed during documentation of the site. Site SMP-P-2023 is a temporary camp site with flaked stone and ground stone artifacts. A discrete scatter of fire-altered rock representing the remains of a possible hearth was observed in the center of the site).
- Write an ethnographic literature review using existing information. Since ethnographic interviews were conducted in 2009 in order to identify sensitive resources in the Chuckwalla Valley, no additional interviews are proposed.

As noted above, the purpose of this letter is to notify your office of the proposed Palen Solar Project, initiate formal consultation on this undertaking with your office in accordance with 36 C.F.R. § 800 Regulations, and to submit the BLM's APE determination, scope of identification for consultation, and work plan pursuant to 36 C.F.R. § 800.4(a)(1).

We appreciate your attention to our request and look forward to consulting on the proposed undertaking. If we can provide any information or address any questions regarding this undertaking, please do not hesitate to contact Jennifer Whyte (BLM Project Manager) at (303) 239-3708 or jwhyte@blm.gov. You can also contact George Kline (BLM Archaeologist) at (760) 833-7135 or gkline@blm.gov.

Sincerely,

Vicki L. Wood

Vicki L. Wood
Acting Field Manager

Enclosures:

1- *Work Plan with Figures*
2- *Tribal Contacts List*
3- *Other Organizations Contacts List (Updated)*

CC: Brendon Greenway, Associate State Archaeologist, OHP

BLM Tribal Contacts List
For EDF-RE Palen Solar Project

Agua Caliente Band of Cahuilla Indians
The Honorable Jeff Grubbe,
Chairman
Agua Caliente Band of Cahuilla Indians

Patricia Garcia
Tribal Historic Preservation Officer
Agua Caliente Band of Cahuilla Indians

Tom Davis
Chief Planning and Development Officer
Agua Caliente Band of Cahuilla Indians

Augustine Band of Cahuilla Indians
The Honorable Amanda Vance,
Chairwoman
Augustine Band of Cahuilla Indians

David Saldivar
Environmental Department
Augustine Band of Cahuilla Indians

Cabazon Band of Mission Indians
The Honorable Doug Welmas,
Chairman
Cabazon Band of Mission Indians

Judy Stapp
Cultural Affairs Director
Cabazon Band of Mission Indians

Cahuilla Band of Mission Indians
The Honorable Daniel Salgado,
Chairman
Cahuilla Band of Mission Indians

Luther Salgado, Jr.
Environmental Director
Cahuilla Band of Mission Indians

Chemehuevi Cultural Center
The Honorable Charles Wood,
Chairman
Chemehuevi Indian Tribe

Dr. Jay Cravath
Chemehuevi Cultural Center
Chemehuevi Indian Tribe

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The Honorable Sherry Cordova,
Chairwoman
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The Honorable Dennis Patch Sr. ,
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Deputy Attorney General
Colorado River Indian Tribes

David Harper
Tribal Historic Preservation Officer
Colorado River Indian Tribes

Fort Mojave Indian Tribe
The Honorable Timothy Williams,
Chairman
Fort Mojave Indian Tribe

Linda Otero
Aha Makav Cultural Society
Fort Mojave Indian Tribe
500 Merriman Avenue

Fort Yuma Quechan Tribe
Michael Jackson, Sr.
President
Fort Yuma Quechan Tribe

Manfred Scott
Quechan Cultural Committee
Fort Yuma Quechan Tribe

Arlene Kingery
Historic Preservation Officer
Fort Yuma Quechan Tribe

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The Honorable Robert Martin,
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Morongo Band of Mission Indians

Pauma Valley Band of Luiseño Indians
The Honorable Temet A. Aguilar,
Tribal Council Chairman
Pauma Valley Band of Luiseño Indians

Ramona Band of Cahuilla Mission Indians
The Honorable Joseph Hamilton,
Tribal Chairman
Ramona Band of Cahuilla Mission Indians

John Gomez
Director, Cultural Resources
Ramona Band of Cahuilla Mission Indians

San Manuel Band of Mission Indians
The Honorable Lynn Valbuena,
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The Honorable Scott Cozart,
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Soboba Band of Luiseño Indians

Joseph Ontiveros
Director, Cultural Resources Department
Soboba Band of Luiseño Indians

Torres Martinez Desert Cahuilla Indians
The Honorable Mary L. Resvaloso,
Chairwoman
Torres Martinez Desert Cahuilla Indians

Twenty-Nine Palms Band of Mission Indians
The Honorable Darrell Mike,
Chairman
Twenty-Nine Palms Band of Mission Indians

Anthony Madrigal, Jr.
Tribal Historic Preservation Officer
Twenty-Nine Palms Band of Mission Indians

BLM Other Organizations Contacts List For EDF-RE Palen Solar Project

Nancy Brown
BLM Liaison/Program Analyst
Advisory Council on Historic Preservation

Bob Balgenorth, Chairman
California Unions for Reliable Energy

Bruce Tappeiner
President
Coachella Valley Archaeological Society

Anthony Madrigal, Sr.
Director of Policy and Cultural Resources Mgt.
Desert Renewable Energy Tribal Coalition

Michael Pierson
General Manager
General Patton Museum

Jason Theuer
Cultural Resources Program Manager
Joshua Tree National Park

Josh Hoines
Vegetation Branch Chief
Joshua Tree National Park

Mark Wheeler
President
Joshua Tree National Park Association

Alfredo Figueroa
La Cuna de Atzlan Sacred Sites Protection Circle

Brendon Greenway
Associate State Archaeologist
Office of Historic Preservation

Heather Thomson
County Archaeologist
Riverside Planning Department

STATE OF CALIFORNIA – THE NATURAL RESOURCES AGENCY
EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

October 20, 2016

In Reply Refer To: BLM_2016_0722_001

Vicki L. Wood
Acting Field Manager
Bureau of Land Management
Palm Springs-South Coast Field Office
1201Bird Center Drive
Palm Springs, CA 92262-8001

Re: Section 106 consultation—APE, Identification efforts for the EDF-Renewable Energy Palen (EDF-RE) Solar PV project

Dear Ms. Wood:

The Office of Historic Preservation is in receipt of your letter initiating consultation pursuant to Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations at 36 CFR § 800. The Bureau of Land Management, Palm Springs—South Coast Field Office (BLM) is reviewing an application for a right-of-way (ROW) grant (undertaking) and proposed change in technology for the Palen Solar PV Project (Project). The change in technology for the Project proposes to use photovoltaic (PV) cell panels rather than the previously proposed 25-foot-high solar troughs in the Palen Solar Power Project (2009).

The proposed Project is located immediately north of Interstate 10 in the Chuckwalla Valley, 10 miles east of the Community of Desert Center, California, and a short distance south of Palen Dry Lake; it includes the construction, operation and maintenance of a 500 megawatt (MW) PV solar electrical generating facility encompassing 4,200 acres (6.5 sq. mi) and approximately 7 miles of transmission line located entirely on public lands managed by the BLM. The proposed facility would terminate at the Red Bluff Substation.

BLM notified Indian tribes and other interested parties about the undertaking on July 21-22 and has hosted public workshops in Palm Springs, Ca on June 29, 2016 and August 4, 2016. Sixteen federally recognized Indian tribes have been identified and have been invited to consult on the proposed Project. The Advisory Council on Historic Preservation (ACHP) declined to participate in consultation by letter dated August 1, 2016.

BLM have considered the Project design, information provided by Tribes, and the characteristics of the local geography and terrain and have defined the Area of Potential Effects (APE) as:

- The 4,100-acre project footprint with a 30-foot buffer;
- A 100-acre area for access and staging areas, parking and administrative areas, and on-site substation;
- 300-feet on either side from centerline for the gen-tie corridor, with an expanded radius of 600-feet at proposed pull sites;

- A 5-mile radius beyond the Project site and gen-tie to account for indirect effects, bounded by the Chuckwalla Mountains and a portion of the Palen Dry Lake ACEC to the east.

Based on previous environmental review prepared for this project area, BLM is proposing the following resource identification efforts for this undertaking:

- A Class I records search of new studies to supplement the records search conducted in 2009, including those encompassed in the 1-mile buffer zone surrounding the direct APE;
- A Class III pedestrian survey of the remaining unsurveyed 236.95 acres of the direct APE;
- Re-survey of areas in the northeastern corner of the APE that are identified by a professional hydrologist as being at high risk for natural erosion caused by recent storm events;
- Reevaluation of resources recommended ineligible by AECOM in 2009 as potential contributors to the Desert Training Center;
- Updates to site records for eight prehistoric sites in the APE to document their condition and to evaluate for eligibility for listing in the National Register of Historic Places (NRHP). These sites include SMP-P-1015, -1016, -1017, -1018,-1019A, -1019B, -2013A, and -2013B;
- Conduct limited testing of SMP-P-1015 and SMP-P-2023;
- Review of ethnographic literature using interviews conducted in 2009.

My staff has reviewed your APE determination and proposed identification efforts and I have the following comments:

- Pursuant to 36 CFR § 800.4(a)(1), I agree that the APE defined for this undertaking is appropriate and meets the definition at 36 CFR § 800.16(d).

- Pursuant to 36 CFR § 800.4(b)(1), I do not agree that the proposed level of effort to identify historic properties represents a good faith effort. I recommend the Class I records search include the entire 5-mile radius APE to account for indirect effects rather than being limited to the 1-mile direct APE buffer. I also recommend continued engagement with Indian Tribes and other consulting parties throughout the ROW application process. Otherwise, I agree with your proposed identification efforts.

Thank you for seeking my comments and for considering historic properties in planning your project. I look forward to continuing consultation. If you require further information, please contact Brendon Greenaway of my staff at phone 916-445-7036 or email brendon.greenaway@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Palm Springs-South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262-8001
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January 26, 2017

8100 (P)
CAD066.66
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CERTIFIED MAIL # 7012 1010 0002 6053 3131
RETURN RECEIPT REQUESTED

Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

RE: Proposed APE and Identification Efforts modification to the Palen Solar Project under the Programmatic Agreement (2010)

Dear Ms. Polanco,

The Bureau of Land Management-Palm Springs Field Office (BLM) is continuing our consultation with your office regarding the EDF-Renewable Energy (EDF-RE) - Palen Solar Photo-Voltaic (PV) Project (Project). A *Programmatic Agreement*[1] (Agreement) to meet the agency's requirements under Section 106 of the National Historic Preservation Act was executed in October 2010, and was amended November 25, 2013. A previous letter, dated September 21, 2016, discussed the recent changes to the proposed Project, including a change in ownership and technology. Based on these project changes the BLM is proposing a modification to the area of potential effects (APE), and additional identification efforts within the modified APE. The purpose of this letter is to provide you with the proposed APE modification and identification efforts, and consult with your office on the modification, pursuant to Stipulation II(b)(i) of the Agreement.

In our letter dated September 21, 2016 we identified the modified APE as well as technological changes to the proposed Project. This notification failed to specify that the BLM was consulting to modify the existing APE, or that the BLM was consulting under the Agreement. The modified APE described and identified in our previous communication is included here as Enclosure 1.

[1] *Programmatic Agreement among the Bureau of Land Management-California, the California Energy Commission, Palen Solar I, LLC, and the California State Historic Preservation Officer, Regarding the Palen Solar Power Project-Riverside County, California.* Executed October 2010, Amended November 2013.

The modified Project considered known prehistoric sites in the northeastern most extent of the project area along the shoreline of the Palen Dry Lake, and excluded these areas from the modified Project footprint. Our letter also included a description of additional efforts proposed to identify historic properties within the modified APE as identified in the Palen Solar Cultural Resource Work Plan for Section 106 Compliance (Work Plan). Some of the identification efforts proposed in our previous communication have already been completed, including:

1. The BLM has notified the SHPO by letter of the intent to initiate consultation on the proposed Project and to seek concurrence on the definition of the APE which occurred on July 12, 2016
2. The BLM, with assistance from Aspen Environmental Groug (Aspen), will contact the NHPA designated representatives of the sixteen tribes listed below to inform them of the proposed Project and to invite the tribes to participate in formal government-to-government consultation under Section 106 (Week of July 19, 2016). The Tribes will be invited to public workshops (occurred on June 29,2016) to learn more detail about the proposed Project. Meetings with individual Tribes will be scheduled for tribes who express interest in formal government-to-government consultation. Should any Tribes not respond to initial outreach, BLM will continue to provide them with project updates and promptly initiate consultation if a tribe at any point requests it.
    1. Agua Caliente Band of Cahuilla Indians
    2. Augustine Band of Cahuilla Indians
    3. Cabazon Band of Mission Indians
    4. Cahuilla Band of Mission Indians
    5. Chemehuevi Indian Tribe
    6. Cocopah Indian Tribe
    7. Colorado River Indian Tribes
    8. Fort Mojave Indian Tribe
    9. Fort Yuma Quechan Tribe
    10. Morongo Band of Mission Indians
    11. Pauma Valley Band of Luiseno Indians
    12. Ramona Band of Mission Cahuilla Indians
    13. San Manuel Band of Mission Indians
    14. Soboba Band of Luiseno Indians
    15. Torres Martinez Desert Cahuilla Indians
    16. Twenty-Nine Palms Band of Mission Indians

The BLM recognizes that we did not specify that we were consulting under the Agreement in our previous notification. We did provide all APE modification information and proposed identification efforts to your office for a 30 review period. The modified APE and Work Plan was also concurrently distributed to all other Consulting Parties. As noted at the outset, the BLM requests to consult with your office regarding the modified Project APE and identification efforts, for no more than 15 days, consistent with Stipulation II(b)(i) of the Agreement.

We look forward to continuing our consultation regarding the EDF-RE Palen Solar Project. For information about this undertaking or for clarification about this request, please contact Mark DeMaio, Project Manager, by telephone: (760) 833-7124 or by email: mdemaio@blm.gov; or

George Kline, Field Office Archaeologist, by telephone: (760) 833-7135 or by email: gkline@blm.gov. You can also contact me directly by telephone: (760) 833-7100 or by email: dherrema@blm.gov.

Sincerely,

Douglas J. Herrema, JD
Field Office Manager

Enclosures (2):

1. Modified project description, and modified APE map.
2. Work Plan

Electronic cc:
Jennifer Whyte (jwhyte@blm.gov)
Mark DeMaio (mdemaio@blm.gov)
Tiffany Arend (tarend@blm.gov)
Tony Overly (soverly@blm.gov)

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Palm Springs-South Coast Field Office
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February 17, 2017

In Reply Refer To:
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CERTIFIED MAIL # 7016 1970 0000 9891 0219
RETURN RECEIPT REQUESTED

Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

RE: Letter Dated February 26, 2017 Regarding the Proposed APE and Identification Efforts modification to the Palen Solar Project under the Programmatic Agreement (2010).

Dear Ms. Polanco,

The Bureau of Land Management, Palm Springs – South Coast Field Office (BLM) is continuing our consultation with your office regarding the EDF-Renewable Energy (EDF-RE) – Palen Solar Photo-Voltaic (PV) Project (Project). A *Programmatic Agreement*[1] (Agreement) to meet the agency's requirements under Section 106 of the National Historic Preservation Act was executed in October 2010, and was amended November 25, 2013.

In our letter dated January 26, 2017 BLM proposed a modification to the area of potential effects (APE) and additional identification efforts reflecting changes to the proposed Project, including a change in ownership and technology. The purpose of that letter was to provide you with the proposed APE modification and identification efforts, and consult with your office on the modification, pursuant to Stipulation II (b)(i) of the Agreement. BLM further requested to consult with your office regarding the modified Project APE and identification efforts, for no more than 15 days, consistent with Stipulation II (b)(i) of the Agreement.

---

[1] *Programmatic Agreement among the Bureau of Land Management-California, the California Energy Commission, Palen Solar I, LLC, and the California State Historic Preservation Officer, Regarding the Palen Solar Power Project – Riverside County, California.* Executed October 2010, Amended November 2013.

BLM is in the process of working with your staff to evaluate whether the Agreement should undergo an extensive amendment process (pursuant to Stipulation XI) to address the needs of the current Project, or whether we should pursue termination of the Agreement in consultation with you pursuant to Stipulation XIII. Therefore, BLM requests that you rescind the January 26, 2017 consultation letter referenced above.

We look forward to continuing our consultation regarding the EDF-RE Palen Solar Project. For information about this undertaking or for clarification about this request, please contact Mark DeMaio, Project Manager, by telephone: (760) 833-7124 or by email: mdemaio@blm.gov; or George Kline, Field Office Archaeologist, by telephone: (760) 833-7135 or by email: gkline@blm.gov. You can also contact me directly by telephone: (760) 833-7100 or by email: dherrema@blm.gov.

Sincerely,

for

Douglas J. Herrema, JD
Field Office Manager

Electronic cc:
Jennifer Whyte (jwhyte@blm.gov)
Mark DeMaio (mdemaio@blm.gov)
Tiffany Arend (tarend@blm.gov)
Tony Overly (soverly@blm.gov)
Brendon Greenaway (brendon.greenaway@parks.ca.gov)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Palm Springs South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262
www.blm.gov/california

In Reply Refer To:
8100 (P)
CAD066
CACA-48810

FEB 23 2017

CERTIFIED MAIL 7014 2120 0004 5554 4738
RETURN RECEIPT REQUESTED

Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

RE: Request to consult regarding proposed termination of the Programmatic Agreement for the Palen Solar Project

Dear Ms. Polanco:

The Bureau of Land Management, Palm Springs-South Coast Field Office (BLM) is continuing our consultation with you regarding the Palen Solar Photovoltaic Project (Project), proposed by EDF-Renewable Energy. A Programmatic Agreement[1] (Agreement) to meet the BLM's requirements under Section 106 of the National Historic Preservation Act for two previous solar project proposals (involving the same general area) was executed between the BLM and State Historic Preservation Officer on October 7, 2010, and amended on November 25, 2013. The BLM proposes to terminate the Agreement, and is requesting consultation with you pursuant to Stipulation XIII of the Agreement.

The BLM has reviewed the Agreement based on the current Project description and has found that the Agreement would require extensive revision through the amendment process at Stipulation XI to remain legally defensible for reviewing the current Project. The Agreement was originally developed (and amended) for two previous solar project proposals involving technologies, project footprints, and potential direct and indirect effects to historic properties that differ substantially from the current Project. For example, references throughout the Agreement to the involvement of the California Energy Commission (CEC) in project review and approval are no longer applicable. The CEC does not have jurisdiction over the current Project because the proposed technology is photovoltaic rather than heated fluids.

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[1] *Programmatic Agreement among the Bureau of Land Management-California, the California Energy Commission, Palen Solar I, LLC, and the California State Historic Preservation Officer, Regarding the Palen Solar Power Project – Riverside County, California.* Executed October 2010, and amended November 2013.

Additionally, Stipulation II of the Agreement contains a detailed two-page description of the Area of Potential Effects (APE) for the Project that defines it essentially as "a 15 mile radius around the block area of the Project." This definition was intended for previous project proposals involving solar trough and solar power tower technologies. The APE description under Stipulation II is no longer applicable because the solar trough and solar power tower technologies are not part of the current Project proposal and will not be analyzed in the Supplemental Environmental Impact Statement (SEIS).
Furthermore, the BLM has found numerous other provisions of the Agreement including appendices on Coordination with the CEC (Appendix B II), Project Description (Appendix D), and Project Maps and Illustrations (Appendix E) that should either be entirely removed or substantially revised.

On this basis, we are requesting consultation with you regarding termination of the Agreement. Given that the Draft SEIS is nearly ready for public release, we believe the best path forward at this point would be for the BLM to continue its review of the Project under the Section 106 regulations at 36 CFR 800.4-6, rather than work with you and other parties to develop a new programmatic agreement for the Project. The BLM previously consulted with you, and received concurrence on October 20, 2016, regarding the APE and identification efforts for the current Project. The BLM continues to identify historic properties within this APE.

The BLM looks forward to continuing our consultation regarding the Project and requests an expedited response so that we can notify the Advisory Council on Historic Preservation and the Consulting Parties regarding termination of the Agreement and our intent to move forward under 36 CFR 800.4-6.

For information about this request, please contact James Barnes, Associate State Archaeologist, at (916) 978-4676 or jjbarnes@blm.gov. You can also contact me directly by telephone at (760) 833-7100 or dherrema@blm.gov.

Sincerely,

Douglas J. Herrema, JD
Field Manager

Electronic cc:

Mark DeMaio (mdemaio@blm.gov)
Tiffany Arend (tarend@blm.gov)
Tony Overly (soverly@blm.gov)
George Kline (gkline@blm.gov)

STATE OF CALIFORNIA – THE NATURAL RESOURCES AGENCY

EDMUND G. BROWN, JR., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

RECEIVED
BUREAU OF LAND MANAGEMENT
17 MAR -2 PM 12:45
PALM SPRINGS-SOUTH COAST
RESOURCE AREA

JEC 3/2/2017

February 27, 2017

Refer to: BLM100216A

Douglas J. Herrema, JD, Field Manager
United States Department of Interior
Bureau of Land Management
Palm Springs Field South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262

RE: Request to consult regarding proposed termination of the Programmatic Agreement for the Palen Solar Project

Dear Mr. Herrema:

The Office of Historic Preservation is in receipt of your letter dated February 23, 2017 regarding your proposal to terminate the *Programmatic Agreement among the Bureau of Land Management—California, the California Energy Commission, Palen Solar I, LLC, and the California State Historic Preservation Officer, Regarding the Palen Solar Power Project—Riverside County, California* (Agreement).

Changes in technology and Area of Potential Effects, as well as the lack of involvement by the California Energy Commission has led the Bureau of Land Management (BLM) to determine that its responsibilities under Section 106 are no longer appropriately satisfied by the original terms of the Agreement. BLM instead propose to satisfy its responsibilities under Section 106 of the National Historic Preservation Act using 36 CFR § 800.4-800.6 rather than consulting to amend the Agreement or develop a new Programmatic Agreement.

After review of your proposal, pursuant to Stipulation XIII, I agree to terminate the Agreement.

If my staff can be of any further assistance, please contact Brendon Greenaway at (916) 445-7036 or Brendon.Greenaway@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

Electronic cc:

James Barnes, Bureau of Land Management
Tony Overly, Bureau of Land Management
Tiffany Arrend, Bureau of Land Management
George Kline, Bureau of Land Management

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
[illegible]

February 27, 2013

[illegible]
United States [illegible]
[illegible]
[illegible]
[illegible]
Palm Springs, CA 92262

[illegible]

Dear [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Sincerely,

[illegible]

[illegible]

[illegible], Bureau of Land Management
[illegible], Bureau of Land Management
[illegible], Bureau of Land Management
[illegible]

Appendix D.2

Tribal Consultation Letters

Appendix D.2 includes a copy of the letters sent to Native American Tribes. Table D.2-1 lists the Tribes that received the letters.

Table D.2-1. Tribal Consultation Letters

Recipients	Notice of the Palen Solar Project	Proposed APE, Identification Efforts, and Work Plan	Notification of Termination of the PA for the Palen Solar Project
Jeff Grubbe Chairman Agua Caliente Band of Cahuilla Indians	X	X	X
Patricia Garcia Tribal Historic Preservation Officer Agua Caliente Band of Cahuilla Indians	X		
Tom Davis Chief Planning and Development Officer Agua Caliente Band of Cahuilla Indians	X		
Amanda Vance Chairwoman Augustine Band of Cahuilla Indians	X	X	
David Saldivar Environmental Department Augustine Band of Cahuilla Indians	X	X	
Mary Ann Green Chairperson Augustine Band of Cahuilla Indians			X
Doug Welmas Chairman Cabazon Band of Mission Indians	X	X	
Judy Stapp Cultural Affairs Director Cabazon Band of Mission Indians 84-245 Indio Springs Parkway	X	X	
Daniel Salgado Chairman Cahuilla Band of Mission Indians	X	X	
Luther Salgado, Jr. Environmental Director Cahuilla Band of Mission Indians	X	X	
Charles Wood Chairman Chemehuevi Indian Tribe	X	X	X
Dr. Jay Cravath Chemehuevi Cultural Center Chemehuevi Indian Tribe	X	X	
Sherry Cordova Chairwoman Cocopah Indian Tribe	X	X	
Jill McCormick Cultural Resources Manager Cocopah Indian Tribe	X	X	
Dennis Patch, Sr Chairman Colorado River Indian Tribes	X	X	X

Table D.2-1. Tribal Consultation Letters

Recipients	Notice of the Palen Solar Project	Proposed APE, Identification Efforts, and Work Plan	Notification of Termination of the PA for the Palen Solar Project
Rebecca Loudbear Attorney General Colorado River Indian Tribes	X	X	
Nancy Jasculca Deputy Attorney General Colorado River Indian Tribes	X	X	
David Harper Tribal Historic Preservation Officer Colorado River Indian Tribes	X	X	
Darrell Mike Chairman Colorado River Indian Tribes			X
Timothy Williams Chairman Fort Mojave Indian Tribe	X	X	X
Linda Otero AhaMakav Cultural Society Fort Mojave Indian Tribe 500 Merriman Avenue	X	X	
Michael Jackson, Sr. President Fort Yuma Quechan Tribe	X	X	X
Manfred Scott Quechan Cultural Committee Fort Yuma Quechan Tribe P.O. Box 1899	X	X	
Arlene Kingery Historic Preservation Officer Fort Yuma Quechan Tribe P.O. Box 1899	X	X	
Robert Martin Chairman Morongo Band of Mission Indians	X	X	X
Temet A. Aguilar Tribal Council Chairman Pauma Valley Band of Luiseno Indians	X		
Joseph Hamilton Tribal Chairman Ramona Band of Cahuilla Mission Indians	X	X	X
John Gomez Director, Cultural Resources Ramona Band of Cahuilla Mission Indians	X	X	
Lynn Valbuena Chairwoman San Manuel Band of Mission Indians	X		X
Daniel McCarthy Cultural Resources Management Department San Manuel Band of Mission Indians	X		

Table D.2-1. Tribal Consultation Letters

Recipients	Notice of the Palen Solar Project	Proposed APE, Identification Efforts, and Work Plan	Notification of Termination of the PA for the Palen Solar Project
Ann Brierty Cultural Resources Field Manager San Manuel Band of Mission Indians	X		
Scott Cozart Chairman Soboba Band of Luiseno Indians	X	X	
Joseph Ontiveros Director, Cultural Resources Department Soboba Band of Luiseno Indians P.O. Box 487	X	X	
Mary L. Resvaloso Chairwoman Torres Martinez Desert Cahuilla Indians	X	X	X
Darrell Mike Chairman Twenty-Nine Palms Band of Mission Indians	X	X	
Anthony Madrigal, Jr. Tribal Historic Preservation Officer Twenty-Nine Palms Band of Mission Indians	X		

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Palm Springs-South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262-8001
(760) 833-7100 Fax (760) 833-7199

Visit us on the Internet at
www.blm.gov/ca/palmsprings/

July 21, 2016

In Reply Refer To:
8100 (P)
CAD066.66
CACA 48810

CERTIFIED MAIL # 7013 1090 0001 2890 0049
RETURN RECEIPT REQUESTED

Honorable Jeff Grubbe
Chairman
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Dr
Palm Springs, CA 92264

RE: Proposed EDF-Renewable Energy Palen (EDF-RE) Solar PV project.

Dear Honorable Chairman Grubbe,

The Bureau of Land Management, Palm Springs – South Coast Field Office (BLM) is reviewing a change in technology for the Palen Solar PV Project (proposed Project), proposed by EDF-RE. EDF-RE is planning an approximately 4,200-acre (6.5 sq. mi.) solar photovoltaic energy generation plant project located immediately north of Interstate 10 in the Chuckwalla Valley; 10 miles east of the Community of Desert Center, California; and a short distance south of Palen Dry Lake (Enclosure 1, Proposed Project Location Map). The proposed project is located entirely on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM), and is located within the Riverside East Solar Energy Zone (RESEZ) of BLM's Western Solar Plan, as designated in the Solar PEIS and approved by a Record of Decision signed by the BLM on Friday, October 12, 2012.

The current proposed project is a change in technology from Solar Millennium's previously proposed Palen Solar Power Project (2009), which proposed 25-foot-high solar troughs. The newly proposed Palen Solar PV Project uses photovoltaic cell panels. The proposed Project's transmission line will be approximately 7 miles long, constructed entirely on federal land, and will terminate at the Red Bluff Substation. The solar panel field would occupy an estimated 4,100 acres with an additional 100 acres of supporting parking, administrative areas, access

corridors, construction laydown areas, access roads, and an on-site substation. The proposed output of the facility is 500 MW, and is expected to power roughly 450,000 homes. The proposed Project constitutes an undertaking for purposes of review under Section 106 of the National Historic Preservation Act (NHPA).

Under Federal law, the BLM is responsible for processing Right Of Way (ROW) applications on BLM property. In processing the applications, the BLM must comply with the requirements of the National Environmental Policy Act (NEPA), which requires that Federal agencies reviewing projects under their jurisdiction consider the environmental impacts associated with their construction and operation. The BLM will be developing a Draft Supplemental Environmental Impact Statement (EIS) and issuing a new Final EIS. Alternatives will concurrently be analyzed for their potential to affect historic properties as required by Section 106 of the NHPA, and will utilize the public review process described in the NEPA to partially meet public involvement responsibilities under the NHPA. In addition, Section 106 documentation for this proposed Project will be published on the BLM website at: http://www.blm.gov/ca/st/en/fo/cdd.html.

Consistent with the principles stated in Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments, November 6, 2000) and the Executive Memorandum of April 29, 1994, (Government to Government Relations with Native American Tribal Governments), we are contacting you at the earliest stages of the supplemental project review and seeking your views and comments, particularly with regard to any issues that may affect resources that are important to your Tribe. This letter serves to provide initial notification of the proposed Project, explain the role of the BLM, and invite your Tribe to enter into government-to-government consultation. The BLM will update the Tribe on the Project throughout the review process, unless the Tribe has no further interest in consulting on this proposed Project. We would request that the Tribe inform us if there is no interest in this proposed Project or no interest in entering into consultation.

Specific to Section 106 of the NHPA, the implementing regulation at 36 CFR 800 requires the BLM to consult with Indian tribes that attach religious or cultural significance to historic properties that may be affected by an undertaking. We request your assistance in identifying any issues or concerns the Tribe may have about the proposed Project. The regulations at 36 CFR 880.2(c)(2)(ii)(C) also state that Federal agency consultation with an Indian tribe must recognize the government-to-government relationship, and requires the agency to consult with representatives designated or identified by the Tribal Government. To facilitate government-to-government consultation on this proposed Project for the purposes of Section 106 and to meet the requirements of 36 CFR 800, the BLM requests that the Tribal Government identify those tribal representatives who have been designated to consult with the BLM on this proposed Project. If you are aware of any other Tribes, individuals, or affiliated Native American organizations that should be contacted regarding this proposed Project, please let us know. A list of other Tribal Government officials receiving this letter is provided for your reference (Enclosure 2).

Identification Efforts

EDF-RE has retained Applied EarthWorks as the primary cultural resources consultant. Applied EarthWorks has access to all of the previous cultural resources studies conducted for both Solar Millennium's Palen Solar Power Project (2009) and BrightSource Energy's Palen Solar Electric Generating System (PSEGS) (2012). This research included records searches and literature reviews at the Eastern Information Center (EIC). A total of twelve previously recorded resources were located within a 1-mile radius of the Project area. The resources consisted of five prehistoric archaeological sites (trail, rock ring, ceramic scatter, seasonal camp, and an isolated lithic piece), seven historic period archaeological sites (Chuckwalla Road, four tin can scatters, and two isolated artifacts). None of these resources was recorded within the Project area. These record searches will be supplemented by a review of reports completed since 2012.

BLM Class III archaeological surveys of the proposed Project area have been conducted by AECOM in 2009 and 2010, ECORP in 2010 and AE in 2010. The majority of the proposed Project area has been surveyed. There are 57 resources present within the proposed Project area including 55 historic-era resources, 1 prehistoric-era resource and 1 multi-component resource. Thirty-two of the historic-era resources are refuse scatters or tank tracks likely associated with the World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA). The remaining 23 historic-era resources include roads, mining claims, section markers, refuse scatters and a corral. The prehistoric resource is a temporary campsite with a hearth feature. The multi-component resource includes both a prehistoric lithic scatter and a historic-era refuse scatter. Any areas within the proposed Project area that have not been surveyed intensively will be surveyed by Applied EarthWorks in the coming months.

In addition, 11 ethnographic resources/Traditional Cultural Properties (TCPs) were identified within 15 miles of the proposed Project. Two of these resources are near but not within the currently proposed Project area. These include: Palen Dunes/Palen Lake TCP and North Chuckwalla Petroglyph District (CA-RIV-01383) TCP.

Finally, geoarchaeological monitoring of a geotechnical investigation within the proposed Project area took place in July 2009 with an absence of cultural resources noted. An additional geoarchaeological study including trench excavations was conducted in 2013. This study concludes that the presence of buried cultural resources within the proposed Project area is unlikely.

A supplemental technical report summarizing the results of the updated record search, the results of the remaining pedestrian survey, and resource eligibility recommendations is forthcoming. Please let us know if you would like to review the report, and we would be happy to send you a copy.

The BLM is requesting your assistance in identifying any issues or concerns the Tribes may have about the proposed Project, including places of religious and cultural significance that might be affected.

If you would like to designate a representative to consult with the BLM, know of any other Tribes that should be contacted regarding this proposed Project, or have any questions or concerns about the proposed Project, please contact

We look forward to hearing from you regarding your interest in the proposed Palen Solar PV Project and our invitation to initiate government-to-government consultation. If you would like to schedule a separate government-to-government consultation meeting with the BLM please contact me by telephone at 760-833-7100. You can also contact Jennifer Whyte (BLM Project Manager) at 303-239-3708 or jwhyte@blm.gov or George Kline (BLM Archaeologist) at 760-833-7135 or gkline@blm.gov.

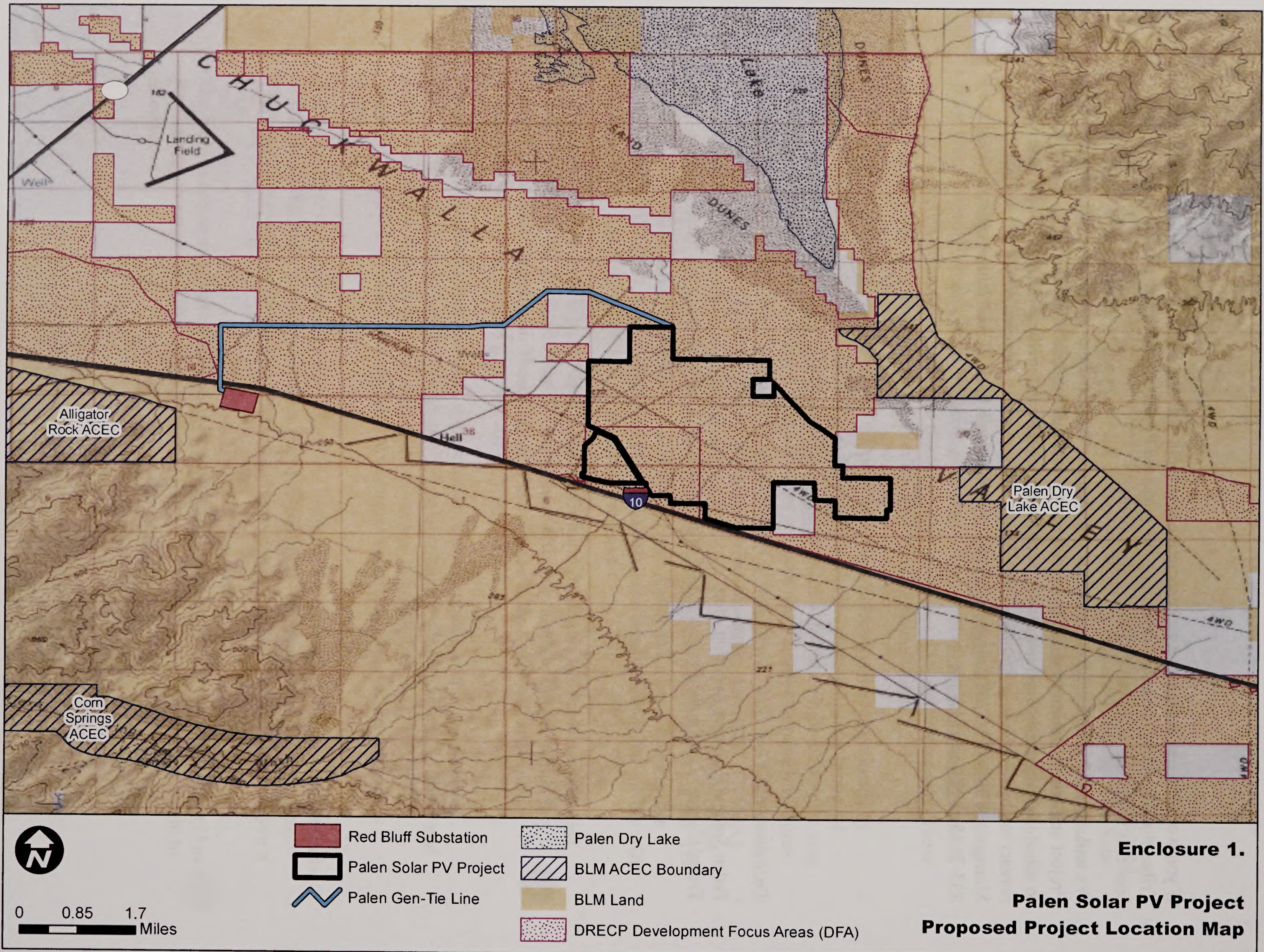
Sincerely,

Vicki L. Wood

Vicki L. Wood,
Acting Field Office Manager

Enclosures (2):

Palen Solar PV Project Location Map
Tribal Contact List for the Proposed EDF-RE Palen Solar PV Project



Enclosure 1.

Palen Solar PV Project
Proposed Project Location Map

BLM Tribal Contacts List
For EDF-RE Palen Solar Project

Agua Caliente Band of Cahuilla Indians

Jeff Grubbe
Chairman
Agua Caliente Band of Cahuilla Indians

Patricia Garcia
Tribal Historic Preservation Officer
Agua Caliente Band of Cahuilla Indians

Tom Davis
Chief Planning and Development Officer
Agua Caliente Band of Cahuilla Indians

Augustine Band of Cahuilla Indians

Amanda Vance
Chairwoman
Augustine Band of Cahuilla Indians

David Saldivar
Environmental Department
Augustine Band of Cahuilla Indians

Cabazon Band of Mission Indians

Doug Welmas
Chairman
Cabazon Band of Mission Indians

Judy Stapp
Cultural Affairs Director
Cabazon Band of Mission Indians
84-245 Indio Springs Parkway

Cahuilla Band of Mission Indians

Daniel Salgado
Chairman
Cahuilla Band of Mission Indians

Luther Salgado, Jr.
Environmental Director
Cahuilla Band of Mission Indians

Chemehuevi Cultural Center

Charles Wood
Chairman
Chemehuevi Indian Tribe

Dr. Jay Cravath
Chemehuevi Cultural Center
Chemehuevi Indian Tribe

Cocopah Indian Tribe

Sherry Cordova
Chairwoman
Cocopah Indian Tribe

Jill McCormick
Cultural Resources Manager
Cocopah Indian Tribe

Colorado River Indian Tribes

Dennis Patch, Sr
Chairman
Colorado River Indian Tribes

Rebecca Loudbear
Attorney General
Colorado River Indian Tribes

Nancy Jasculca
Deputy Attorney General
Colorado River Indian Tribes

David Harper
Tribal Historic Preservation Officer
Colorado River Indian Tribes

Fort Mojave Indian Tribe

Timothy Williams
Chairman
Fort Mojave Indian Tribe

Linda Otero
AhaMakav Cultural Society
Fort Mojave Indian Tribe
500 Merriman Avenue

Fort Yuma Quechan Tribe

Michael Jackson, Sr.
President
Fort Yuma Quechan Tribe

Manfred Scott
Quechan Cultural Committee
Fort Yuma Quechan Tribe
P.O. Box 1899

Arlene Kingery
Historic Preservation Officer
Fort Yuma Quechan Tribe
P.O. Box 1899

Morongo Band of Mission Indians

Robert Martin
Chairman
Morongo Band of Mission Indians

Pauma Valley Band of Luiseno Indians

Temet A. Aguilar
Tribal Council Chairman
Pauma Valley Band of Luiseno Indians

Ramona Band of Cahuilla Mission Indians

Joseph Hamilton
Tribal Chairman
Ramona Band of Cahuilla Mission Indians

John Gomez
Director, Cultural Resources
Ramona Band of Cahuilla Mission Indians

San Manuel Band of Mission Indians

Lynn Valbuena
Chairwoman
San Manuel Band of Mission Indians

Daniel McCarthy
Cultural Resources Management Department
San Manuel Band of Mission Indians

Ann Brierty
Cultural Resources Field Manager
San Manuel Band of Mission Indians

Soboba Band of Luiseno Indians

Scott Cozart
Chairman
Soboba Band of Luiseno Indians

Joseph Ontiveros
Director, Cultural Resources Department
Soboba Band of Luiseno Indians
P.O. Box 487

Torres Martinez Desert Cahuilla Indians

Mary L. Resvaloso
Chairwoman
Torres Martinez Desert Cahuilla Indians

Twenty-Nine Palms Band of Mission Indians

Darrell Mike
Chairman
Twenty-Nine Palms Band of Mission Indians

Anthony Madrigal, Jr.
Tribal Historic Preservation Officer
Twenty-Nine Palms Band of Mission Indians

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Palm Springs-South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262-8001
(760) 833-7100 Fax (760) 833-7199

Visit us on the Internet at
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September 21, 2016

In Reply Refer To:
8100 (P)
CAD066.66
CACA 48810

CERTIFIED MAIL 7016 0600 0000 2904 3068
RETURN RECEIPT REQUESTED

Jeff Grubbe
Chairman
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Dr.
Palm Springs, CA 92264

RE: Proposed APE, Identification Efforts, and Work Plan for the EDF-Renewable Energy Palen (EDF-RE) Solar PV project.

Dear Honorable Chairman Jeff Grubbe,

The Bureau of Land Management, Palm Springs – South Coast Field Office (BLM) is reviewing an application for a right-of-way (ROW) grant and proposed change in technology for the Palen Solar PV Project (proposed Project), submitted by EDF Renewable Energy (EDF-RE). The proposed Project includes the construction, operation and maintenance of a 500 megawatt (MW) photovoltaic (PV) solar electrical generating facility encompassing 4,200 acres (6.5 sq. mi.) and approximately 7 miles of transmission line that would terminate at the Red Bluff Substation. The proposed Project is located entirely on public lands managed by the BLM, and is within the Riverside East Solar Energy Zone (RESEZ) of BLM's Western Solar Plan, as designated in the Solar PEIS and approved by a Record of Decision (ROD) signed by the BLM on Friday, October 12, 2012. The proposed Project would use PV cell panel technology, rather than the previously proposed 25-foot-high solar troughs included in the Palen Solar Power Project (2009). The proposed Project is located immediately north of Interstate 10 in the Chuckwalla Valley, 10 miles east of the Community of Desert Center, California, and a short distance south of Palen Dry Lake (Enclosure 1, Figure 1).

The Project constitutes an undertaking for purposes of review under Section 106 of the National Historic Preservation Act (NHPA). Specific to Section 106 of the NHPA, the implementing regulation at 36 C.F.R. §800 requires the BLM to consult with Indian tribes that attach religious or cultural significance to historic properties that may be affected by an undertaking as well as to involve the public and identify other consulting parties. The BLM notified Indian tribes and

other interested parties about the proposed undertaking on July 21-22, 2016 and invited them to be consulting parties (Enclosure 2). Tribes and other interested parties were also invited to public workshops hosted by the BLM in Palm Springs, California, on June 29, 2016 and August 4, 2016.

The purpose of this letter is to present BLM's determination of the Area of Potential Effect (APE), the scope of historic property identification efforts, and work plan to your tribal representatives for a 30-calendar day period of review and comment. The APE and identification efforts were developed after seeking information from Indian tribes during pre-application information meetings as well as government-to-government consultation pursuant to 36 C.F.R. §800.4(a)(1).

Direct and Indirect APE

The BLM has defined the APE for the agency undertaking based on the submitted proposed Project design and an assessment of the local terrain characteristics, which were factors considered in establishing an APE for previously proposed solar energy projects near the location. Information provided by Tribes was also considered (see Enclosure 1). For the proposed Project site, the APE will include the entirety of the Project land for which the Applicant seeks a permit, plus a 30-foot buffer surrounding the entire Project. This includes 4,100 acres with an additional 100 acres of supporting parking, administrative areas, access corridors, construction laydown areas, access roads, and an on-site substation. For the gen-tie corridor, the APE will include 300 feet on both sides of the centerline, with an expanded radius of 600 feet at proposed pull sites.

The APE for indirect effects is dictated largely by the distance from which the facility can be seen. For consideration of potential indirect effects to historic properties, the APE is expanded to a five-mile radius, beyond the proposed Project site and the gen-tie. The boundary of the indirect effects APE extends as much as five miles from the project footprint in all directions, and is bounded to the southeast by the Chuckwalla Mountains and includes a portion of the Palen Dry Lake ACEC to the east. Both the direct and indirect APEs are shown in Enclosure 1, Figures 1 through 3).

Proposed Scope of Identification Efforts

EDF-RE has contracted with Applied EarthWorks (Æ) to conduct all cultural resources studies associated with the proposed Project. Æ has access to all of the previous cultural resources studies conducted for both Solar Millennium's Palen Solar Power Project (PSPP) (2009) and BrightSource Energy's Palen Solar Electric Generating System Project (PSEGS) (2012). This research included records searches and literature reviews at the Eastern Information Center (EIC). A total of twelve previously recorded resources were located within a 1-mile radius of the Project area. The resources consisted of five prehistoric archaeological sites (trail, rock ring, ceramic scatter, seasonal camp, and an isolated lithic) and seven historic period archaeological sites (Chuckwalla Road, four tin can scatters, and two isolated artifacts). None of these resources are located within the direct APE of the proposed Project area. BLM Class III archaeological surveys of the proposed Project area have been conducted by AECOM in 2009 and 2010, ECORP in 2010, and Æ in 2010.

Based on the review of the aforementioned reports, the majority (~ 94%) of the proposed Project area has been surveyed. There are 57 resources present within the proposed Project's indirect and direct APE, including 55 historic-era resources, 1 prehistoric-era resource and 1 multi-component resource. Two prehistoric resources and 35 historic resources are located within the proposed Project's direct APE. In addition, extensive interviews with tribal members were conducted as part of the Palen Solar Electric Generating System Project (PSEGS). As a result of these interviews, several cultural landscapes and 11 Traditional Cultural Properties were identified.

Based on the previous work completed within the project area, the following resource identification efforts are proposed for this project:

- A Class I record search was prepared in 2009. A supplement to this report will be prepared that reviews any new studies completed since 2009, including those that are encompassed in the 1-mile buffer zone surrounding the direct APE.
- Conduct a Class III pedestrian survey of the remaining unsurveyed 236.95 acres of the direct APE, and re-survey any areas in the Northeastern corner of the APE that may be identified by a professional hydrologist as being at high risk for adverse site impacts due to natural erosion or weathering caused by recent storm events (see Enclosure 1, Figure 4).
- As part of the Class III effort, re-visit historic resources that were provisionally regarded as ineligible in the AECOM 2009 study in order to re-evaluate them as potentially contributing elements of the World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-A MA). CA DPR 523 forms will be updated as needed.
- Conduct site visits and complete updates to CA DPR 523 forms for eight prehistoric sites located within the proposed Project area in order to document the condition of these resources and evaluate their eligibility to the NRHP, particularly those that may contribute to the DTC/C-A MA. These include sites SMP-P-1015, -1016, -1017, -1018, -1019A, -1019B, -2013A, and -2013B, as well as any other resources that may be identified during consultation, or that were identified in recent ethnographic interviews.
- Conduct limited testing of SMP-P-2015 and SMP-P-2023 located within the proposed Project's direct APE to determine whether these resources are eligible for inclusion in the NRHP under Criterion D (i.e., *have yielded, or may be likely to yield, information important in prehistory or history* [36 C.F.R. 60.4]). (Site SMP-P-2015 is a scatter of ground stone and flaked stone artifacts on a low northeast-sloping stabilized dune. A fragment of marine shell was also observed during documentation of the site. Site SMP-P-2023 is a temporary camp site with flaked stone and ground stone artifacts. A discrete scatter of fire-altered rock representing the remains of a possible hearth was observed in the center of the site).
- Write an ethnographic literature review using existing information. Since ethnographic interviews were conducted in 2009 in order to identify sensitive resources in the Chuckwalla Valley, no additional interviews are proposed.

As noted above, the BLM is providing consulting parties the opportunity to provide input about the Area of Potential Effect (APE) and the scope of historic property identification efforts. ***All comments must be received on or before Friday October 21, 2016.***

Please send your questions and comments to Jennifer Whyte (BLM Project Manager) at (303) 239-3708 or jwhyte@blm.gov. You can also contact George Kline (BLM Archaeologist) at (760) 833-7135 or gkline@blm.gov.

Sincerely,

Vicki L Wood

Vicki L. Wood
Acting Field Manager

Enclosures:

1- *Work Plan with Figures*
2- *Tribal Contacts List*

CC: Tom Davis, Chief Planning and Development Officer, Agua Caliente Band of Cahuilla Indians, Patricia Garcia-Plotkin, Tribal Historic Preservation Officer, Agua Caliente Band of Cahuilla Indians

BLM Tribal Contacts List
For EDF-RE Palen Solar Project

Agua Caliente Band of Cahuilla Indians

The Honorable Jeff Grubbe,
Chairman
Agua Caliente Band of Cahuilla Indians

Patricia Garcia
Tribal Historic Preservation Officer
Agua Caliente Band of Cahuilla Indians

Tom Davis
Chief Planning and Development Officer
Agua Caliente Band of Cahuilla Indians

Augustine Band of Cahuilla Indians

The Honorable Amanda Vance,
Chairwoman
Augustine Band of Cahuilla Indians

David Saldivar
Environmental Department
Augustine Band of Cahuilla Indians

Cabazon Band of Mission Indians

The Honorable Doug Welmas,
Chairman
Cabazon Band of Mission Indians

Judy Stapp
Cultural Affairs Director
Cabazon Band of Mission Indians

Cahuilla Band of Mission Indians

The Honorable Daniel Salgado,
Chairman
Cahuilla Band of Mission Indians

Luther Salgado, Jr.
Environmental Director
Cahuilla Band of Mission Indians

Chemehuevi Cultural Center

The Honorable Charles Wood,
Chairman
Chemehuevi Indian Tribe

Dr. Jay Cravath
Chemehuevi Cultural Center
Chemehuevi Indian Tribe

Cocopah Indian Tribe

The Honorable Sherry Cordova,
Chairwoman
Cocopah Indian Tribe

Jill McCormick
Cultural Resources Manager
Cocopah Indian Tribe

Colorado River Indian Tribes

The Honorable Dennis Patch Sr. ,
Chairman
Colorado River Indian Tribes

Rebecca Loudbear
Attorney General
Colorado River Indian Tribes

Nancy Jasculca
Deputy Attorney General
Colorado River Indian Tribes

David Harper
Tribal Historic Preservation Officer
Colorado River Indian Tribes

Fort Mojave Indian Tribe

The Honorable Timothy Williams,
Chairman
Fort Mojave Indian Tribe

Linda Otero
Aha Makav Cultural Society
Fort Mojave Indian Tribe
500 Merriman Avenue

Fort Yuma Quechan Tribe

Michael Jackson, Sr.
President
Fort Yuma Quechan Tribe

Manfred Scott
Quechan Cultural Committee
Fort Yuma Quechan Tribe

Arlene Kingery
Historic Preservation Officer
Fort Yuma Quechan Tribe

Morongo Band of Mission Indians

The Honorable Robert Martin,
Chairman
Morongo Band of Mission Indians

Pauma Valley Band of Luiseño Indians

The Honorable Temet A. Aguilar,
Tribal Council Chairman
Pauma Valley Band of Luiseño Indians

Ramona Band of Cahuilla Mission Indians

The Honorable Joseph Hamilton,
Tribal Chairman
Ramona Band of Cahuilla Mission Indians

John Gomez
Director, Cultural Resources
Ramona Band of Cahuilla Mission Indians

San Manuel Band of Mission Indians

The Honorable Lynn Valbuena,
Chairwoman
San Manuel Band of Mission Indians

Daniel McCarthy
Cultural Resources Management Department
San Manuel Band of Mission Indians

Ann Brierty
Cultural Resources Field Manager
San Manuel Band of Mission Indians

Soboba Band of Luiseño Indians

The Honorable Scott Cozart,
Chairman
Soboba Band of Luiseño Indians

Joseph Ontiveros
Director, Cultural Resources Department
Soboba Band of Luiseño Indians

Torres Martinez Desert Cahuilla Indians

The Honorable Mary L. Resvaloso,
Chairwoman
Torres Martinez Desert Cahuilla Indians

Twenty-Nine Palms Band of Mission Indians

The Honorable Darrell Mike,
Chairman
Twenty-Nine Palms Band of Mission Indians

Anthony Madrigal, Jr.
Tribal Historic Preservation Officer
Twenty-Nine Palms Band of Mission Indians

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Palm Springs South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262
www.blm.gov/california

In Reply Refer To:
CAD066 8100 (P)
CACA 48810

MAR 09 2017

CERTIFIED MAIL 7014 2120 0004 5554 3427
RETURN RECEIPT REQUESTED

Jeff Grubbe, Chairman
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92264

RE: Notification of termination of the Programmatic Agreement for the Palen Solar Project, Riverside County, CA

Dear Chairman Grubbe:

The Bureau of Land Management, Palm Springs-South Coast Field Office (BLM) is continuing our efforts to inform and consult with the Agua Caliente Band of Cahuilla Indians regarding the Palen Solar Photovoltaic Project (Project), proposed by EDF-Renewable Energy. A Programmatic Agreement[1] (Agreement) to meet the BLM's requirements under Section 106 of the National Historic Preservation Act for two previous solar project proposals (involving the same general area) was executed between the BLM and California State Historic Preservation Officer (SHPO) on October 7, 2010, and amended on November 25, 2013. The BLM notifies you that it has terminated the Agreement (pursuant Stipulation XIII) in consultation with the State Historic Preservation Office (SHPO), effective February 27, 2017, and will continue reviewing the Project under the Section 106 regulations at 36 CFR 800.4-6.

The BLM reviewed the Agreement based on the current Project description and found that the Agreement would require extensive revision through the amendment process at Stipulation XI to remain legally defensible for reviewing the current Project. The Agreement was originally developed (and amended) for two previous solar project proposals involving technologies, project footprints, and potential direct and indirect effects to historic properties that differ substantially from the current Project. For example, references throughout the Agreement to the involvement of the California Energy Commission (CEC) in project review and approval are no longer applicable. The CEC does not have jurisdiction over the current Project because the proposed technology is photovoltaic rather than heated fluids.

Additionally, Stipulation II of the Agreement contains a detailed two-page description of the Area of Potential Effects (APE) for the Project that defines it essentially as "a 15 mile radius around the block area of the Project." This definition was intended for previous project proposals involving solar trough and solar power tower technologies. The APE description under Stipulation II is no longer applicable because the solar trough and solar power tower technologies are not part of the current Project proposal and will not be analyzed in the Supplemental Environmental Impact Statement (SEIS).

[1] *Programmatic Agreement among the Bureau of Land Management-California, the California Energy Commission, Palen Solar I, LLC, and the California State Historic Preservation Officer, Regarding the Palen Solar Power Project – Riverside County, California.* Executed October 2010, and amended November 2013.

Furthermore, the BLM has found numerous other provisions of the Agreement including appendices on Coordination with the CEC (Appendix B II), Project Description (Appendix D), and Project Maps and Illustrations (Appendix E) that should either be entirely removed or substantially revised.

On this basis, we consulted with the SHPO to terminate the Agreement, with SHPO agreement on February 27, 2017. The BLM and SHPO believe the best path forward at this point would be for the BLM to continue its review of the Project under the Section 106 regulations at 36 CFR 800.4-6, rather than work with you, the SHPO, and other parties to develop a new programmatic agreement for the Project. Based on our identification and evaluation efforts for two previous applications within the same general application area, and ongoing additional identification and evaluation efforts for the current Project, the BLM and SHPO no longer believe that a phased approach to identification and evaluation is necessary.

The BLM looks forward to continuing our consultation with you regarding the Project. We are concurrently notifying the Advisory Council on Historic Preservation, the tribes and all other Consulting Parties regarding termination of the Agreement and our intent to move forward under 36 CFR 800.4-6.

For information about this notification, or to schedule a separate Government-to-Government meeting, please contact George Kline, Archaeologist, at (760) 833-7135 or gkline@blm.gov. You may also contact me directly by telephone at (760) 833-7100 or dherrema@blm.gov.

Sincerely,

Janet L. Cheek for

Douglas J. Herrema, JD
Field Manager

Appendix D.3

Consulting Parties Consultation Letters

Appendix D.3 includes a copy of the letters sent to the Consulting Parties. Table D.3-1 lists the Consulting Parties that received the letters.

Table D.3-1. Consulting Parties Consultation Letters

Recipients	Notice of the Palen Solar Project	Proposed APE, Identification Efforts, and Work Plan
Bob Balgenorth Chairman California Unions for Reliable Energy	X	X
Bruce Tappeiner President Coachella Valley Archaeological Society	X	X
Anthony Madrigal Sr. Director of Policy and Cultural Resources Mgt. Desert Renewable Energy Tribal Coalition	X	X
Michael Pierson General Manager General Patton Museum	X	X
Jason Theuer Cultural Resources Program Manager Joshua Tree National Park	X	X
Mark Wheeler President Joshua Tree National Park Association	X	X
Alfredo Figueroa La Cuna de Atzlan Sacred Sites Protection Circle	X	X
Heather Thomson County Archaeologist Riverside Planning Dept	X	X

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July 22, 2016

In Reply Refer To:
8100 (P)
CAD066.66
CACA 48810

CERTIFIED MAIL # 7013 1090 0001 2890 0025
RETURN RECEIPT REQUESTED

Bob Balgenorth
Chairman
Calif Unions for Reliable Energy
1231 I St Ste 302
Sacramento, A 95814

RE: Proposed EDF-Renewable Energy Palen (EDF-RE) Solar PV project.

Dear Mr.Balgenorth,

The Bureau of Land Management, Palm Springs – South Coast Field Office (BLM) is reviewing a change in technology for the Palen Solar PV Project (proposed Project), proposed by EDF-RE. EDF-RE is planning an approximately 4,200-acre (6.5 sq. mi.) solar photovoltaic energy generation plant project located immediately north of Interstate 10 in the Chuckwalla Valley; 10 miles east of the Community of Desert Center, California; and a short distance south of Palen Dry Lake (Enclosure 1, Proposed Project Location Map). The proposed project is located entirely on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM), and is located within the Riverside East Solar Energy Zone (RESEZ) of BLM's Western Solar Plan, as designated in the Solar PEIS and approved by a Record of Decision signed by the BLM on Friday, October 12, 2012.

The current proposed project is a change in technology from Solar Millennium's previously proposed Palen Solar Power Project (2009), which proposed 25-foot-high solar troughs. The newly proposed Palen Solar PV Project uses photovoltaic cell panels. The proposed Project's transmission line will be approximately 7 miles long, constructed entirely on federal land, and will terminate at the Red Bluff Substation. The solar panel field would occupy an estimated 4,100 acres with an additional 100 acres of supporting parking, administrative areas, access corridors, construction laydown areas, access roads, and an on-site substation. The proposed output of the facility is 500 MW, and is expected to power roughly 450,000 homes. The

proposed Project constitutes an undertaking for purposes of review under Section 106 of the National Historic Preservation Act (NHPA).

Under Federal law, the BLM is responsible for processing Right Of Way (ROW) applications on BLM property. In processing the applications, the BLM must comply with the requirements of the National Environmental Policy Act (NEPA), which requires that Federal agencies reviewing projects under their jurisdiction consider the environmental impacts associated with their construction and operation. The BLM will be developing a Draft Supplemental Environmental Impact Statement (EIS) and issuing a new Final EIS. Alternatives will concurrently be analyzed for their potential to affect historic properties as required by Section 106 of the NHPA, and will utilize the public review process described in the NEPA to partially meet public involvement responsibilities under the NHPA. In addition, Section 106 documentation for this proposed Project will be published on the BLM website at: http://www.blm.gov/ca/st/en/fo/cdd.html.

We are contacting you at the earliest stages of project review and seeking your views and comments, particularly with regard to any issues that may affect resources that are important to you. This letter serves to provide initial notification of the proposed Project and explain the role of the BLM. The BLM will update you on the Project throughout the review process, unless you have no further interest in this proposed Project.

Specific to Section 106 of the NHPA, the implementing regulation at 36 CFR 800 requires the BLM identify individuals or groups with a demonstrated interest in the undertaking. We request your assistance in identifying any issues or concern you may have about the proposed Project. If you are aware of any other individuals or organizations that should be contacted regarding this proposed Project please let us know. A list of individuals and organizations receiving this letter is provided for your reference (Enclosure 2).

Identification Efforts
EDF-RE has retained Applied EarthWorks as the primary cultural resources consultant. Applied EarthWorks has access to all of the previous cultural resources studies conducted for both Solar Millennium's Palen Solar Power Project (2009) and BrightSource Energy's Palen Solar Electric Generating System (PSEGS) (2012). This research included records searches and literature reviews at the Eastern Information Center (EIC). A total of twelve previously recorded resources were located within a 1-mile radius of the Project area. The resources consisted of five prehistoric archaeological sites (trail, rock ring, ceramic scatter, seasonal camp, and an isolated lithic piece), seven historic period archaeological sites (Chuckwalla Road, four tin can scatters, and two isolated artifacts). None of these resources was recorded within the Project area. These record searches will be supplemented by a review of reports completed since 2012.

BLM Class III archaeological surveys of the proposed Project area have been conducted by AECOM in 2009 and 2010, ECORP in 2010 and AE in 2010. The majority of the proposed Project area has been surveyed. There are 57 resources present within the proposed Project area including 55 historic-era resources, 1 prehistoric-era resource and 1 multi-component resource. Thirty-two of the historic-era resources are refuse scatters or tank tracks likely associated with the World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA). The remaining 23 historic-era resources include roads, mining claims, section markers, refuse scatters and a corral. The prehistoric resource is a temporary campsite with a hearth feature. The

multi-component resource includes both a prehistoric lithic scatter and a historic-era refuse scatter. Any areas within the proposed Project area that have not been surveyed intensively will be surveyed by Applied EarthWorks in the coming months.

In addition, 11 ethnographic resources/Traditional Cultural Properties (TCPs) were identified within 15 miles of the proposed Project. Two of these resources are near but not within the currently proposed Project area. These include: Palen Dunes/Palen Lake TCP and North Chuckwalla Petroglyph District (CA-RIV-01383) TCP.

Finally, geoarchaeological monitoring of a geotechnical investigation within the proposed Project area took place in July 2009 with an absence of cultural resources noted. An additional geoarchaeological study including trench excavations was conducted in 2013. This study concludes that the presence of buried cultural resources within the proposed Project area is unlikely.

A supplemental technical report summarizing the results of the updated record search, the results of the remaining pedestrian survey, and resource eligibility recommendations is forthcoming.

If you would like to be a Consulting Party, know of any other individuals or organizations that should be contacted regarding this proposed Project, or have any questions or concerns about the proposed Project, please contact Jennifer Whyte (BLM Project Manager) at 303-239-3708 or jwhyte@blm.gov. You can also contact George Kline (BLM Archaeologist) at 760-833-7135 or gkline@blm.gov.

We look forward to hearing from you regarding your interest in the proposed Palen Solar PV Project.

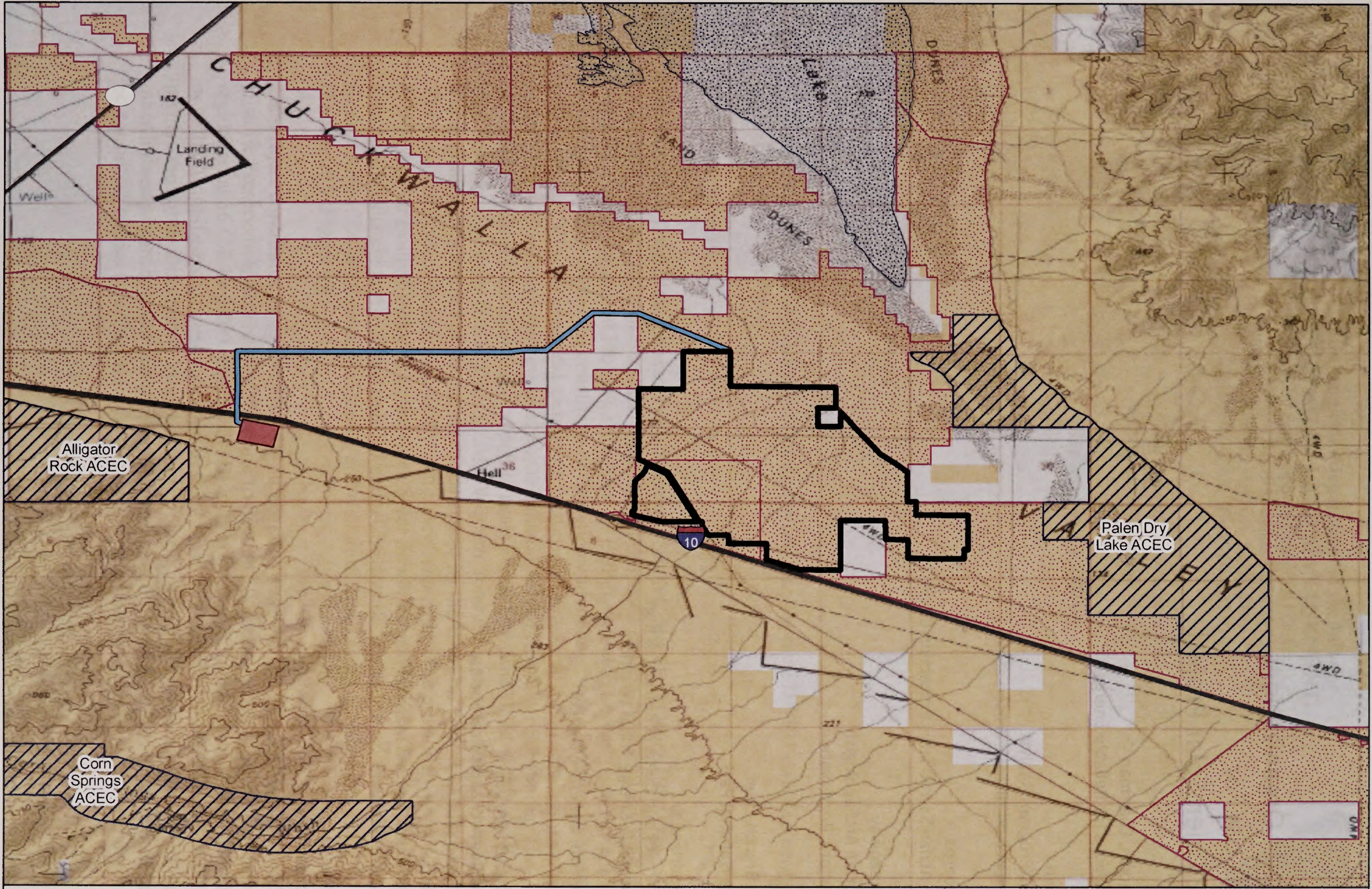
Sincerely,

Vicki L. Wood

Vicki L. Wood,
Acting Field Office Manager

Enclosures (2):

Palen Solar PV Project Location Map
Contact List for the Proposed EDF-RE Palen Solar PV Project



Enclosure 1.

Palen Solar PV Project
Proposed Project Location Map

BLM Other Organizations Contacts List For EDF-RE Palen Solar Project

Bob Balgenorth, Chairman
California Unions for Reliable Energy

Nancy Brown
BLM Liaison/Program Analyst
Advisory Council on Historic Preservation

Alfredo Figueroa
La Cuna de Atzlan Sacred Sites Protection Circle

Brendon Greenway
Associate State Archaeologist
Office of Historic Preservation

Josh Hoines
Vegetation Branch Chief
Joshua Tree National Park

Anthony Madrigal, Sr.
Director of Policy and Cultural Resources Mgt.
Desert Renewable Energy Tribal Coalition

Michael Pierson, General Manager
General Patton Museum

Bruce Tappeiner, President
Coachella Valley Archaeological Society

Jason Theuer
Cultural Resources Program Manager
Joshua Tree National Park

Heather Thomson
County Archaeologist
Riverside Planning Department

Mark Wheeler, President
Joshua Tree National Park Association

United States Department of the Interior
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Palm Springs, CA 92262-8001
(760) 833-7100 Fax (760) 833-7199

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September 21, 2016

In Reply Refer To:
8100 (P)
CAD066.66
CACA 48810

Bob Balgenorth
Chairman
California Unions for Reliable Energy
1231 I St. Suite 302
Sacramento, CA 95814

RE: Proposed APE, Identification Efforts, and Work Plan for the EDF-Renewable Energy Palen (EDF-RE) Solar PV project.

Dear Mr.Balgenorth,

The Bureau of Land Management, Palm Springs – South Coast Field Office (BLM) is reviewing an application for a right-of-way (ROW) grant and proposed change in technology for the Palen Solar PV Project (proposed Project), submitted by EDF Renewable Energy (EDF-RE). The proposed Project includes the construction, operation and maintenance of a 500 megawatt (MW) photovoltaic (PV) solar electrical generating facility encompassing 4,200 acres (6.5 sq. mi.) and approximately 7 miles of transmission line terminating at the Red Bluff Substation. The proposed Project is located entirely on public lands managed by the BLM within the Riverside East Solar Energy Zone (RESEZ) of BLM's Western Solar Plan, as designated in the Solar PEIS and approved by a Record of Decision (ROD) signed by the BLM on Friday, October 12, 2012. The proposed Project includes use of PV cell panels, rather than the previously proposed 25-foot-high solar troughs included in the Palen Solar Power Project (2009). The proposed Project is located immediately north of Interstate 10 in the Chuckwalla Valley, 10 miles east of the Community of Desert Center, California, and a short distance south of Palen Dry Lake (Enclosure 1, Figure 1).

The Project constitutes an undertaking for purposes of review under Section 106 of the National Historic Preservation Act (NHPA). Specific to Section 106 of the NHPA, the implementing regulation at 36 C.F.R. § 800 requires the BLM to consult with Indian tribes that attach religious or cultural significance to historic properties that may be affected by an undertaking as well as to involve the public and identify other consulting parties. The BLM notified Indian tribes and other interested parties about this proposed undertaking on July 21-22, 2016 and invited them to be consulting parties (see Enclosure 2). Tribes and other interested parties were also invited to

attend public workshops hosted by BLM in Palm Springs, California, on June 29, 2016 and August 4, 2016.

The purpose of this letter is to present BLM's determination of the Area of Potential Effects (APE), the scope of historic property identification efforts, and work plan to you for a 30-calendar day period for review and comment. The APE and identification efforts were developed after seeking information from interested parties and Indian tribes during pre-application information meetings, as well as tribal government-to-government consultation pursuant to 36 C.F.R. § 800.4(a)(1).

Direct and Indirect APE

The BLM has defined the APE for the agency undertaking based on the submitted Project design and an assessment of the local terrain characteristics, factors that were considered in establishing the APE for previously proposed solar energy projects near the location, as well as information provided by Tribes and other interested parties (see Enclosure 1). For the proposed Project site, the APE will include the entirety of the Project land for which the Applicant seeks a permit, plus a 30-foot buffer surrounding the entire Project. This includes 4,100 acres with an additional 100 acres of supporting parking, administrative areas, access corridors, construction laydown areas, access roads, and an on-site substation. For the gen-tie corridor, the APE will include 300 feet on both sides of the centerline, with an expanded radius of 600 feet at proposed pull sites.

The APE for indirect effects is dictated largely by the distance from which the facility can be seen. For consideration of potential indirect effects to historic properties, the APE is expanded to a five-mile radius, beyond the Project site and the gen-tie. The boundary of the indirect effects APE extends as much as five miles from the project footprint in all directions, and is bounded to the southeast by the Chuckwalla Mountains and includes a portion of the Palen Dry Lake ACEC to the east. Both the direct and indirect APEs are shown in Enclosure 1.

Proposed Scope of Identification Efforts

EDF-RE has contracted with Applied EarthWorks (Æ) to conduct all cultural resources studies associated with the proposed Project. Æ has access to all of the previous cultural resources studies conducted for both Solar Millennium's Palen Solar Power Project (PSPP) (2009) and BrightSource Energy's Palen Solar Electric Generating System (PSEGS) (2012). This research included records searches and literature reviews at the Eastern Information Center (EIC). BLM Class III archaeological surveys of the proposed Project area have been conducted by AECOM in 2009 and 2010, ECORP in 2010, and Æ in 2010. Based on the review of the aforementioned reports, the majority (~ 94%) of the proposed Project area has been surveyed. In addition, extensive interviews with tribal members were conducted as part of the Palen Solar Electric Generating System Project (PSEGS). As a result, several cultural landscapes and Traditional Cultural Properties were identified.

Based on the previous work completed within the project area, the following resource identification efforts are proposed for this project:

- A Class I record search was prepared in 2009. A supplement to this report will be prepared that reviews any new studies completed since 2009, including those that are encompassed in the 1-mile buffer zone surrounding the direct APE.
- Conduct a Class III pedestrian survey of the remaining unsurveyed 236.95 acres of the direct APE, and re-survey any areas in the Northeastern corner of the APE that may be identified by a professional hydrologist as being at high risk for adverse site impacts due to natural erosion or weathering caused by recent storm events (see Enclosure 1, Figure 4).
- As part of the Class III effort, re-visit historic resources that were provisionally regarded as ineligible in the AECOM 2009 study in order to re-evaluate them as potentially contributing elements of the World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-A MA). CA DPR 523 forms will be updated as needed.
- Conduct site visits and complete updates to CA DPR 523 forms for eight prehistoric sites located within the proposed Project area in order to document the condition of these resources and evaluate their eligibility to the NRHP, particularly those that may contribute to the DTC/C-A MA. These include sites SMP-P-1015, -1016, -1017, -1018, -1019A, -1019B, -2013A, and -2013B, as well as any other resources that may be identified during consultation, or that were identified in recent ethnographic interviews.
- Conduct limited testing of SMP-P-2015 and SMP-P-2023 located within the proposed Project's direct APE to determine whether these resources are eligible for inclusion in the NRHP under Criterion D (i.e., *have yielded, or may be likely to yield, information important in prehistory or history* [36 CFR 60.4]).
- Write an ethnographic literature review using existing information. Since ethnographic interviews were conducted in 2009 in order to identify sensitive resources in the Chuckwalla Valley, no additional interviews are proposed.

As noted above, the BLM is providing consulting parties the opportunity to provide input about the Area of Potential Effects (APE) and the scope of historic property identification efforts. ***All comments must be received on or before Friday October 21, 2016.***

Please send your questions and comments to Jennifer Whyte (BLM Project Manager) at (303) 239-3708 or jwhyte@blm.gov. You can also contact George Kline (BLM Archaeologist) at (760) 833-7135 or gkline@blm.gov.

Sincerely,

Vicki L Wood

Vicki L. Wood
Acting Field Manager

Enclosures:
1- *Work Plan with Figures*
2- *Other Organizations Contacts List*

BLM Other Organizations Contacts List For EDF-RE Palen Solar Project

Nancy Brown
BLM Liaison/Program Analyst
Advisory Council on Historic Preservation

Bob Balgenorth, Chairman
California Unions for Reliable Energy

Bruce Tappeiner
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Anthony Madrigal, Sr.
Director of Policy and Cultural Resources Mgt.
Desert Renewable Energy Tribal Coalition

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General Manager
General Patton Museum

Jason Theuer
Cultural Resources Program Manager
Joshua Tree National Park

Josh Hoines
Vegetation Branch Chief
Joshua Tree National Park

Mark Wheeler
President
Joshua Tree National Park Association

Alfredo Figueroa
La Cuna de Atzlan Sacred Sites Protection Circle

Brendon Greenway
Associate State Archaeologist
Office of Historic Preservation

Heather Thomson
County Archaeologist
Riverside Planning Department

Appendix E

Air Quality and Greenhouse Gas Calculations

Palen Solar Project

Mojave Desert Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	182,952.00	1000sqft	4,200.00	182,952,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	31
Climate Zone	15			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Overall 30 mo or 660 days of construction

Off-road Equipment - up to 56 equipment count plus 132 ATVs as Off-Highway Tractors in Seq 3 Throughout

Off-road Equipment - up to 82 equipment count w hydraulic ram or pile driver as Bore / Drill Rigs in Seq 2 Installing Panels

Off-road Equipment - up to 58 equipment count during Seq 1 Grading Prep

Trips and VMT - activities throughout include worker commutes and water trucks

On-road Fugitive Dust - Water trucks 5% unpaved; HHDT 1% unpaved

Grading - permanent disturbance 4200 ac

Architectural Coating - no coatings needed

Vehicle Trips - TR 0.0005 per 1000sqft per day: fewer than 100 daily operational trips

Road Dust - approx 1% unpaved VMT during ops

Consumer Products - consumer products not applicable

Area Coating - no coatings necessary

Energy Use - energy use not applicable

Water And Wastewater - interior water consumption factors not applicable

Solid Waste - light industrial solid waste not applicable

Land Use Change - land use conversion calculated separately

Construction Off-road Equipment Mitigation - Tier 3 fleet in 2010 Condition of Certification AQ-SC5; 55 percent effective PM10 control per Rule 403

Table Name	Column Name	Default Value	New Value
tblAreaCoating	ReapplicationRatePercent	10	0.01
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	33.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	29.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00

tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	13.00
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tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	155,000.00	572.00
tblConstructionPhase	NumDays	6,000.00	392.00
tblConstructionPhase	PhaseEndDate	7/4/2022	3/25/2020
tblConstructionPhase	PhaseEndDate	10/25/2021	4/23/2020

tblConstructionPhase	PhaseStartDate	4/24/2020	1/16/2018
tblConstructionPhase	PhaseStartDate	4/16/2019	10/13/2017
tblConsumerProducts	ROG_EF	2.14E-05	1E-08
tblEnergyUse	LightingElect	3.36	0.00
tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	T24E	2.69	0.00
tblEnergyUse	T24NG	16.16	0.00
tblGrading	AcresOfGrading	9,212.00	4,200.00
tblGrading	MaterialImported	0.00	53,300.00
tblOffRoadEquipment	HorsePower	122.00	49.00
tblOffRoadEquipment	HorsePower	80.00	226.00
tblOffRoadEquipment	HorsePower	80.00	89.00
tblOffRoadEquipment	LoadFactor	0.38	0.29
tblOffRoadEquipment	LoadFactor	0.50	0.20
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	7.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	26.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOnRoadDust	HaulingPercentPave	100.00	99.00
tblOnRoadDust	HaulingPercentPave	100.00	99.00
tblOnRoadDust	HaulingPercentPave	100.00	99.00
tblOnRoadDust	VendorPercentPave	100.00	95.00
tblOnRoadDust	WorkerPercentPave	100.00	95.00
tblOnRoadDust	WorkerPercentPave	100.00	95.00
tblProjectCharacteristics	OperationalYear	2014	2020
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblRoadDust	RoadPercentPave	100	99

tblSolidWaste	SolidWasteGenerationRate	226,860.48	0.00
tblTripsAndVMT	HaulingTripLength	20.00	165.50
tblTripsAndVMT	HaulingTripLength	20.00	165.50
tblTripsAndVMT	HaulingTripLength	20.00	165.50
tblTripsAndVMT	HaulingTripNumber	6,663.00	4,556.00
tblTripsAndVMT	HaulingTripNumber	0.00	660.00
tblTripsAndVMT	HaulingTripNumber	0.00	23,990.00
tblTripsAndVMT	VendorTripLength	6.60	13.00
tblTripsAndVMT	VendorTripNumber	0.00	94.00
tblTripsAndVMT	VendorTripNumber	29,986.00	0.00
tblTripsAndVMT	WorkerTripLength	16.80	165.50
tblTripsAndVMT	WorkerTripNumber	470.00	588.00
tblTripsAndVMT	WorkerTripNumber	76,840.00	145.00
tblVehicleTrips	CC_TL	6.60	165.00
tblVehicleTrips	CNW_TL	6.60	165.00
tblVehicleTrips	CW_TL	14.70	165.00
tblVehicleTrips	ST_TR	1.32	5.0000e-004
tblVehicleTrips	SU_TR	0.68	5.0000e-004
tblVehicleTrips	WD_TR	6.97	5.0000e-004
tblWater	ElectricityIntensityFactorForWastewaterTreatment	1,911.00	0.00
tblWater	ElectricityIntensityFactorToDistribute	1,272.00	0.00
tblWater	ElectricityIntensityFactorToSupply	9,727.00	0.00
tblWater	ElectricityIntensityFactorToTreat	111.00	0.00
tblWater	IndoorWaterUseRate	42,307,650,000.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	2.4200	23.6097	25.8381	0.0457	25.6021	1.1333	26.7353	6.6840	1.0491	7.7331	0.0000	3,722.1724	3,722.1724	0.6047	0.0000	3,734.8717
2018	13.1381	135.8297	135.7166	0.3046	107.5356	6.2591	113.7948	16.4238	5.7962	22.2200	0.0000	25,111.9593	25,111.9593	4.3944	0.0000	25,204.2414
2019	7.8937	79.4228	98.4454	0.2536	92.9999	3.5596	96.5595	14.9401	3.2921	18.2321	0.0000	20,059.0097	20,059.0097	3.1943	0.0000	20,126.0890
2020	1.5566	14.8786	23.5833	0.0651	40.2731	0.6502	40.9233	4.7308	0.6005	5.3313	0.0000	4,861.1709	4,861.1709	0.7053	0.0000	4,875.9830
Total	**25.0084**	**253.7408**	**283.5833**	**0.6690**	**266.4107**	**11.6023**	**278.0129**	**42.7787**	**10.7378**	**53.5165**	**0.0000**	**53,754.3123**	**53,754.3123**	**8.8987**	**0.0000**	**53,941.1851**

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.8998	11.3339	24.0080	0.0457	7.0994	0.4755	7.5749	1.7571	0.4719	2.2291	0.0000	3,722.170 4	3,722.170 4	0.6047	0.0000	3,734.869 7
2018	5.7273	87.2367	145.5776	0.3046	32.8496	3.8024	36.6520	5.8873	3.7702	9.6575	0.0000	25,111.94 36	25,111.94 36	4.3944	0.0000	25,204.22 56
2019	4.2848	63.6605	113.6840	0.2536	29.4386	2.8374	32.2760	5.5144	2.8108	8.3251	0.0000	20,058.99 89	20,058.99 89	3.1943	0.0000	20,126.07 81
2020	0.9772	13.7376	27.5688	0.0651	12.4884	0.6261	13.1145	1.9567	0.6200	2.5767	0.0000	4,861.168 7	4,861.168 7	0.7053	0.0000	4,875.980 8
Total	11.8891	175.9687	310.8383	0.6690	81.8760	7.7414	89.6174	15.1155	7.6728	22.7883	0.0000	53,754.28 15	53,754.28 15	8.8987	0.0000	53,941.15 42

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	52.46	30.65	-9.61	0.00	69.27	33.28	67.77	64.67	28.54	57.42	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7051	0.0156	1.6919	1.3000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003	0.0000	3.2691	3.2691	8.7700e-003	0.0000	3.4532
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.4686	2.8511	9.8025	0.0297	21.0000	0.0616	21.0616	2.4156	0.0568	2.4724	0.0000	2,129.3517	2,129.3517	0.0726	0.0000	2,130.8752
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.1736**	**2.8667**	**11.4944**	**0.0298**	**21.0000**	**0.0677**	**21.0677**	**2.4156**	**0.0628**	**2.4785**	**0.0000**	**2,132.6208**	**2,132.6208**	**0.0813**	**0.0000**	**2,134.3284**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7051	0.0156	1.6919	1.3000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003	0.0000	3.2691	3.2691	8.7700e-003	0.0000	3.4532
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.4686	2.8511	9.8025	0.0297	21.0000	0.0616	21.0616	2.4156	0.0568	2.4724	0.0000	2,129.351 7	2,129.351 7	0.0726	0.0000	2,130.875 2
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	1.1736	2.8667	11.4944	0.0298	21.0000	0.0677	21.0677	2.4156	0.0628	2.4785	0.0000	2,132.620 8	2,132.620 8	0.0813	0.0000	2,134.328 4

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/13/2017	4/15/2019	5	392	1 Grading and Prep
2	Activities Throughout	Trenching	10/13/2017	4/23/2020	5	660	3 Throughout Construction
3	Installing Facilities	Building Construction	1/16/2018	3/25/2020	5	572	2 Installing Panels and Wiring

Acres of Grading (Site Preparation Phase): 4200

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Cranes	7	8.00	226	0.29
Site Preparation	Crushing/Proc. Equipment	10	6.00	85	0.78
Site Preparation	Graders	13	8.00	174	0.41
Site Preparation	Rubber Tired Dozers	7	8.00	255	0.40
Site Preparation	Scrapers	17	8.00	361	0.48
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Activities Throughout	Forklifts	26	8.00	89	0.20
Activities Throughout	Off-Highway Tractors	132	8.00	49	0.44
Activities Throughout	Rubber Tired Loaders	10	8.00	199	0.36
Activities Throughout	Tractors/Loaders/Backhoes	20	8.00	97	0.37
Installing Facilities	Bore/Drill Rigs	33	8.00	205	0.50
Installing Facilities	Cranes	1	7.00	226	0.29
Installing Facilities	Excavators	3	8.00	162	0.38
Installing Facilities	Forklifts	3	8.00	89	0.20
Installing Facilities	Generator Sets	4	8.00	84	0.74
Installing Facilities	Rollers	9	6.00	226	0.29
Installing Facilities	Tractors/Loaders/Backhoes	26	8.00	97	0.37
Installing Facilities	Trenchers	7	8.00	89	0.20
Installing Facilities	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	58	145.00	0.00	4,556.00	16.80	6.60	165.50	LD_Mix	HDT_Mix	HHDT
Activities Throughout	188	588.00	94.00	660.00	165.50	13.00	165.50	LD_Mix	HDT_Mix	HHDT
Installing Facilities	87	145.00	0.00	23,990.00	16.80	6.60	165.50	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					10.4931	0.0000	10.4931	4.7827	0.0000	4.7827	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.5198	16.7536	10.3031	0.0140		0.8029	0.8029		0.7451	0.7451	0.0000	1,291.740 5	1,291.740 5	0.3699	0.0000	1,299.508 8
Total	**1.5198**	**16.7536**	**10.3031**	**0.0140**	**10.4931**	**0.8029**	**11.2960**	**4.7827**	**0.7451**	**5.5278**	**0.0000**	**1,291.740 5**	**1,291.740 5**	**0.3699**	**0.0000**	**1,299.508 8**

3.2 Site Preparation - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0246	0.4355	0.2512	1.8700e-003	5.3306	0.0131	5.3437	0.5701	0.0121	0.5822	0.0000	168.8177	168.8177	8.3000e-004	0.0000	168.8353
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0168	0.0357	0.3271	6.0000e-004	4.6418	3.6000e-004	4.6421	0.4713	3.3000e-004	0.4716	0.0000	43.0530	43.0530	2.6500e-003	0.0000	43.1087
Total	**0.0414**	**0.4712**	**0.5783**	**2.4700e-003**	**9.9723**	**0.0135**	**9.9858**	**1.0414**	**0.0124**	**1.0538**	**0.0000**	**211.8707**	**211.8707**	**3.4800e-003**	**0.0000**	**211.9440**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.8415	0.0000	1.8415	0.8394	0.0000	0.8394	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3500	6.7759	8.1472	0.0140		0.2972	0.2972		0.2965	0.2965	0.0000	1,291.739 0	1,291.739 0	0.3699	0.0000	1,299.507 2
Total	**0.3500**	**6.7759**	**8.1472**	**0.0140**	**1.8415**	**0.2972**	**2.1387**	**0.8394**	**0.2965**	**1.1358**	**0.0000**	**1,291.739 0**	**1,291.739 0**	**0.3699**	**0.0000**	**1,299.507 2**

3.2 Site Preparation - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0246	0.4355	0.2512	1.8700e-003	1.3952	0.0131	1.4083	0.1772	0.0121	0.1893	0.0000	168.8177	168.8177	8.3000e-004	0.0000	168.8353
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0168	0.0357	0.3271	6.0000e-004	1.0819	3.6000e-004	1.0822	0.1158	3.3000e-004	0.1162	0.0000	43.0530	43.0530	2.6500e-003	0.0000	43.1087
Total	**0.0414**	**0.4712**	**0.5783**	**2.4700e-003**	**2.4771**	**0.0135**	**2.4906**	**0.2930**	**0.0124**	**0.3054**	**0.0000**	**211.8707**	**211.8707**	**3.4800e-003**	**0.0000**	**211.9440**

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					10.4931	0.0000	10.4931	4.7827	0.0000	4.7827	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.2102	67.6626	43.0606	0.0654		3.1925	3.1925		2.9631	2.9631	0.0000	5,933.372 3	5,933.372 3	1.7174	0.0000	5,969.438 6
Total	**6.2102**	**67.6626**	**43.0606**	**0.0654**	**10.4931**	**3.1925**	**13.6856**	**4.7827**	**2.9631**	**7.7458**	**0.0000**	**5,933.372 3**	**5,933.372 3**	**1.7174**	**0.0000**	**5,969.438 6**

3.2 Site Preparation - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1100	1.7845	1.1348	8.7000e-003	5.3728	0.0601	5.4329	0.5854	0.0553	0.6407	0.0000	773.0788	773.0788	3.8100e-003	0.0000	773.1587
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0668	0.1496	1.3544	2.7900e-003	21.6340	1.6000e-003	21.6356	2.1965	1.4800e-003	2.1980	0.0000	193.0692	193.0692	0.0114	0.0000	193.3081
Total	**0.1768**	**1.9341**	**2.4893**	**0.0115**	**27.0068**	**0.0617**	**27.0685**	**2.7819**	**0.0567**	**2.8386**	**0.0000**	966.1480	966.1480	**0.0152**	**0.0000**	966.4668

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.8415	0.0000	1.8415	0.8394	0.0000	0.8394	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6205	31.4595	37.9374	0.0654		1.3787	1.3787		1.3759	1.3759	0.0000	5,933.365 3	5,933.365 3	1.7174	0.0000	5,969.431 5
Total	**1.6205**	**31.4595**	**37.9374**	**0.0654**	**1.8415**	**1.3787**	**3.2202**	**0.8394**	**1.3759**	**2.2153**	**0.0000**	**5,933.365 3**	**5,933.365 3**	**1.7174**	**0.0000**	**5,969.431 5**

3.2 Site Preparation - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1100	1.7845	1.1348	8.7000e-003	1.4375	0.0601	1.4975	0.1925	0.0553	0.2478	0.0000	773.0788	773.0788	3.8100e-003	0.0000	773.1587
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0668	0.1496	1.3544	2.7900e-003	5.0424	1.6000e-003	5.0440	0.5399	1.4800e-003	0.5414	0.0000	193.0692	193.0692	0.0114	0.0000	193.3081
Total	**0.1768**	**1.9341**	**2.4893**	**0.0115**	**6.4798**	**0.0617**	**6.5415**	**0.7324**	**0.0567**	**0.7892**	**0.0000**	**966.1480**	**966.1480**	**0.0152**	**0.0000**	**966.4668**

3.2 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					10.4931	0.0000	10.4931	4.7827	0.0000	4.7827	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6467	17.7465	11.7014	0.0188		0.8253	0.8253		0.7656	0.7656	0.0000	1,679.898 9	1,679.898 9	0.4916	0.0000	1,690.222 2
Total	**1.6467**	**17.7465**	**11.7014**	**0.0188**	**10.4931**	**0.8253**	**11.3184**	**4.7827**	**0.7656**	**5.5483**	**0.0000**	**1,679.898 9**	**1,679.898 9**	**0.4916**	**0.0000**	**1,690.222 2**

3.2 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0306	0.4641	0.3178	2.5000e-003	5.3345	0.0170	5.3515	0.5715	0.0156	0.5872	0.0000	218.3327	218.3327	1.0700e-003	0.0000	218.3552
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0170	0.0392	0.3534	8.0000e-004	6.2167	4.5000e-004	6.2171	0.6312	4.2000e-004	0.6316	0.0000	53.4371	53.4371	3.0500e-003	0.0000	53.5012
Total	**0.0476**	**0.5032**	**0.6712**	**3.3000e-003**	**11.5511**	**0.0174**	**11.5686**	**1.2027**	**0.0160**	**1.2187**	**0.0000**	**271.7698**	**271.7698**	**4.1200e-003**	**0.0000**	**271.8564**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.8415	0.0000	1.8415	0.8394	0.0000	0.8394	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4634	9.0129	10.8939	0.0188		0.3948	0.3948		0.3941	0.3941	0.0000	1,679.896 9	1,679.896 9	0.4916	0.0000	1,690.220 2
Total	**0.4634**	**9.0129**	**10.8939**	**0.0188**	**1.8415**	**0.3948**	**2.2364**	**0.8394**	**0.3941**	**1.2335**	**0.0000**	**1,679.896 9**	**1,679.896 9**	**0.4916**	**0.0000**	**1,690.220 2**

3.2 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0306	0.4641	0.3178	2.5000e-003	1.3991	0.0170	1.4161	0.1786	0.0156	0.1942	0.0000	218.3327	218.3327	1.0700e-003	0.0000	218.3552
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0170	0.0392	0.3534	8.0000e-004	1.4490	4.5000e-004	1.4494	0.1551	4.2000e-004	0.1556	0.0000	53.4371	53.4371	3.0500e-003	0.0000	53.5012
Total	0.0476	0.5032	0.6712	3.3000e-003	2.8481	0.0174	2.8655	0.3337	0.0160	0.3498	0.0000	271.7698	271.7698	4.1200e-003	0.0000	271.8564

3.3 Activities Throughout - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4628	4.7163	2.7513	4.5700e-003		0.2952	0.2952		0.2716	0.2716	0.0000	424.0552	424.0552	0.1299	0.0000	426.7837
Total	0.4628	4.7163	2.7513	4.5700e-003		0.2952	0.2952		0.2716	0.2716	0.0000	424.0552	424.0552	0.1299	0.0000	426.7837

3.3 Activities Throughout - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.1100e-003	0.0375	0.0216	1.6000e-004	0.7715	1.1300e-003	0.7727	0.0823	1.0400e-003	0.0834	0.0000	14.5251	14.5251	7.0000e-005	0.0000	14.5267
Vendor	0.0371	0.3024	0.5110	1.0000e-003	2.3332	7.5400e-003	2.3407	0.2382	6.9400e-003	0.2451	0.0000	89.0494	89.0494	5.0000e-004	0.0000	89.0598
Worker	0.3567	1.3287	11.6728	0.0235	2.0320	0.0130	2.0450	0.5394	0.0120	0.5514	0.0000	1,690.9315	1,690.9315	0.1008	0.0000	1,693.0488
Total	**0.3960**	**1.6686**	**12.2054**	**0.0246**	5.1367	**0.0217**	**5.1584**	**0.8600**	**0.0200**	**0.8799**	**0.0000**	**1,794.5060**	**1,794.5060**	**0.1014**	**0.0000**	**1,796.6353**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1124	2.4183	3.0770	4.5700e-003		0.1431	0.1431		0.1431	0.1431	0.0000	424.0547	424.0547	0.1299	0.0000	426.7832
Total	**0.1124**	**2.4183**	**3.0770**	**4.5700e-003**		**0.1431**	**0.1431**		**0.1431**	**0.1431**	**0.0000**	**424.0547**	**424.0547**	**0.1299**	**0.0000**	**426.7832**

3.3 Activities Throughout - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.1100e-003	0.0375	0.0216	1.6000e-004	0.2014	1.1300e-003	0.2026	0.0254	1.0400e-003	0.0265	0.0000	14.5251	14.5251	7.0000e-005	0.0000	14.5267
Vendor	0.0371	0.3024	0.5110	1.0000e-003	0.5474	7.5400e-003	0.5549	0.0599	6.9400e-003	0.0668	0.0000	89.0494	89.0494	5.0000e-004	0.0000	89.0598
Worker	0.3567	1.3287	11.6728	0.0235	2.0320	0.0130	2.0450	0.5394	0.0120	0.5514	0.0000	1,690.9315	1,690.9315	0.1008	0.0000	1,693.0488
Total	**0.3960**	**1.6686**	**12.2054**	**0.0246**	**2.7808**	**0.0217**	**2.8025**	**0.6248**	**0.0200**	**0.6447**	**0.0000**	**1,794.5060**	**1,794.5060**	**0.1014**	**0.0000**	**1,796.6353**

3.3 Activities Throughout - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.8488	19.0179	12.4287	0.0213		1.1436	1.1436		1.0521	1.0521	0.0000	1,943.7715	1,943.7715	0.6051	0.0000	1,956.4791
Total	**1.8488**	**19.0179**	**12.4287**	**0.0213**		**1.1436**	**1.1436**		**1.0521**	**1.0521**	**0.0000**	**1,943.7715**	**1,943.7715**	**0.6051**	**0.0000**	**1,956.4791**

3.3 Activities Throughout - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.4600e-003	0.1535	0.0976	7.5000e-004	0.7752	5.1700e-003	0.7803	0.0837	4.7500e-003	0.0884	0.0000	66.5160	66.5160	3.3000e-004	0.0000	66.5229
Vendor	0.1565	1.2520	2.2141	4.6300e-003	10.8742	0.0328	10.9070	1.1102	0.0302	1.1403	0.0000	407.8027	407.8027	2.2400e-003	0.0000	407.8497
Worker	1.3410	5.5723	48.2473	0.1094	9.4705	0.0584	9.5288	2.5141	0.0539	2.5680	0.0000	7,582.948 9	7,582.948 9	0.4336	0.0000	7,592.053 5
Total	**1.5069**	**6.9778**	**50.5590**	**0.1147**	**21.1198**	**0.0963**	**21.2161**	**3.7079**	**0.0888**	**3.7968**	**0.0000**	**8,057.267 6**	**8,057.267 6**	**0.4361**	**0.0000**	**8,066.426 0**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.5239	11.2708	14.3411	0.0213		0.6668	0.6668		0.6668	0.6668	0.0000	1,943.769 2	1,943.769 2	0.6051	0.0000	1,956.476 7
Total	**0.5239**	**11.2708**	**14.3411**	**0.0213**		**0.6668**	**0.6668**		**0.6668**	**0.6668**	**0.0000**	**1,943.769 2**	**1,943.769 2**	**0.6051**	**0.0000**	**1,956.476 7**

3.3 Activities Throughout - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.4600e-003	0.1535	0.0976	7.5000e-004	0.2051	5.1700e-003	0.2102	0.0267	4.7500e-003	0.0315	0.0000	66.5160	66.5160	3.3000e-004	0.0000	66.5229
Vendor	0.1565	1.2520	2.2141	4.6300e-003	2.5511	0.0328	2.5839	0.2792	0.0302	0.3093	0.0000	407.8027	407.8027	2.2400e-003	0.0000	407.8497
Worker	1.3410	5.5723	48.2473	0.1094	9.4705	0.0584	9.5288	2.5141	0.0539	2.5680	0.0000	7,582.9489	7,582.9489	0.4336	0.0000	7,592.0535
Total	**1.5069**	**6.9778**	**50.5590**	**0.1147**	**12.2267**	**0.0963**	**12.3230**	**2.8200**	**0.0888**	**2.9088**	**0.0000**	**8,057.2676**	**8,057.2676**	**0.4361**	**0.0000**	**8,066.4260**

3.3 Activities Throughout - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.6605	17.1211	12.2095	0.0213		0.9897	0.9897		0.9105	0.9105	0.0000	1,912.1127	1,912.1127	0.6050	0.0000	1,924.8172
Total	**1.6605**	**17.1211**	**12.2095**	**0.0213**		**0.9897**	**0.9897**		**0.9105**	**0.9105**	**0.0000**	**1,912.1127**	**1,912.1127**	**0.6050**	**0.0000**	**1,924.8172**

3.3 Activities Throughout - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.1600e-003	0.1390	0.0952	7.5000e-004	0.7752	5.0900e-003	0.7803	0.0837	4.6800e-003	0.0883	0.0000	65.3733	65.3733	3.2000e-004	0.0000	65.3800
Vendor	0.1444	1.1298	2.0879	4.6300e-003	10.8742	0.0309	10.9051	1.1102	0.0284	1.1386	0.0000	400.8297	400.8297	2.1600e-003	0.0000	400.8751
Worker	1.1354	5.0810	43.8050	0.1093	9.4705	0.0571	9.5276	2.5141	0.0529	2.5670	0.0000	7,303.780 2	7,303.780 2	0.4060	0.0000	7,312.306 1
Total	**1.2889**	**6.3498**	**45.9881**	**0.1147**	**21.1198**	**0.0931**	**21.2129**	**3.7079**	**0.0860**	**3.7940**	**0.0000**	**7,769.983 3**	**7,769.983 3**	**0.4085**	**0.0000**	**7,778.561 2**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.5239	11.2708	14.3411	0.0213		0.6668	0.6668		0.6668	0.6668	0.0000	1,912.110 5	1,912.110 5	0.6050	0.0000	1,924.814 9
Total	**0.5239**	**11.2708**	**14.3411**	**0.0213**		**0.6668**	**0.6668**		**0.6668**	**0.6668**	**0.0000**	**1,912.110 5**	**1,912.110 5**	**0.6050**	**0.0000**	**1,924.814 9**

3.3 Activities Throughout - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.1600e-003	0.1390	0.0952	7.5000e-004	0.2051	5.0900e-003	0.2102	0.0267	4.6800e-003	0.0314	0.0000	65.3733	65.3733	3.2000e-004	0.0000	65.3800
Vendor	0.1444	1.1298	2.0879	4.6300e-003	2.5511	0.0309	2.5820	0.2792	0.0284	0.3076	0.0000	400.8297	400.8297	2.1600e-003	0.0000	400.8751
Worker	1.1354	5.0810	43.8050	0.1093	9.4705	0.0571	9.5276	2.5141	0.0529	2.5670	0.0000	7,303.7802	7,303.7802	0.4060	0.0000	7,312.3061
Total	1.2889	6.3498	45.9881	0.1147	12.2267	0.0931	12.3198	2.8200	0.0860	2.9060	0.0000	7,769.9833	7,769.9833	0.4085	0.0000	7,778.5612

3.3 Activities Throughout - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.4757	4.8817	3.7848	6.6900e-003		0.2710	0.2710		0.2494	0.2494	0.0000	587.5451	587.5451	0.1900	0.0000	591.5356
Total	0.4757	4.8817	3.7848	6.6900e-003		0.2710	0.2710		0.2494	0.2494	0.0000	587.5451	587.5451	0.1900	0.0000	591.5356

3.3 Activities Throughout - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7700e-003	0.0389	0.0291	2.3000e-004	0.7720	1.5800e-003	0.7736	0.0825	1.4500e-003	0.0840	0.0000	20.0727	20.0727	1.0000e-004	0.0000	20.0748
Vendor	0.0405	0.3024	0.6125	1.4500e-003	3.4164	8.8400e-003	3.4252	0.3488	8.1300e-003	0.3569	0.0000	123.0470	123.0470	6.4000e-004	0.0000	123.0605
Worker	0.3159	1.4718	12.7022	0.0343	2.9754	0.0177	2.9931	0.7899	0.0164	0.8063	0.0000	2,201.717 1	2,201.717 1	0.1208	0.0000	2,204.253 8
Total	**0.3592**	**1.8131**	**13.3438**	**0.0360**	**7.1638**	**0.0281**	**7.1919**	**1.2212**	**0.0260**	**1.2472**	**0.0000**	**2,344.836 8**	**2,344.836 8**	**0.1215**	**0.0000**	**2,347.389 0**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1646	3.5410	4.5056	6.6900e-003		0.2095	0.2095		0.2095	0.2095	0.0000	587.5444	587.5444	0.1900	0.0000	591.5349
Total	**0.1646**	**3.5410**	**4.5056**	**6.6900e-003**		**0.2095**	**0.2095**		**0.2095**	**0.2095**	**0.0000**	**587.5444**	**587.5444**	**0.1900**	**0.0000**	**591.5349**

3.3 Activities Throughout - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7700e-003	0.0389	0.0291	2.3000e-004	0.2019	1.5800e-003	0.2035	0.0256	1.4500e-003	0.0270	0.0000	20.0727	20.0727	1.0000e-004	0.0000	20.0748
Vendor	0.0405	0.3024	0.6125	1.4500e-003	0.8015	8.8400e-003	0.8103	0.0877	8.1300e-003	0.0958	0.0000	123.0470	123.0470	6.4000e-004	0.0000	123.0605
Worker	0.3159	1.4718	12.7022	0.0343	2.9754	0.0177	2.9931	0.7899	0.0164	0.8063	0.0000	2,201.7171	2,201.7171	0.1208	0.0000	2,204.2538
Total	**0.3592**	**1.8131**	**13.3438**	**0.0360**	**3.9788**	**0.0281**	**4.0069**	**0.9032**	**0.0260**	**0.9292**	**0.0000**	**2,344.8368**	**2,344.8368**	**0.1215**	**0.0000**	**2,347.3890**

3.4 Installing Facilities - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.9511	33.9259	21.9591	0.0589		1.5559	1.5559		1.4430	1.4430	0.0000	5,354.3241	5,354.3241	1.5965	0.0000	5,387.8500
Total	**2.9511**	**33.9259**	**21.9591**	**0.0589**		**1.5559**	**1.5559**		**1.4430**	**1.4430**	**0.0000**	**5,354.3241**	**5,354.3241**	**1.5965**	**0.0000**	**5,387.8500**

3.4 Installing Facilities - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.3802	6.1681	3.9226	0.0301	28.1937	0.2076	28.4013	3.0473	0.1910	3.2383	0.0000	2,672.143 7	2,672.143 7	0.0132	0.0000	2,672.419 9
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0640	0.1433	1.2974	2.6700e-003	20.7222	1.5400e-003	20.7238	2.1039	1.4200e-003	2.1053	0.0000	184.9322	184.9322	0.0109	0.0000	185.1610
Total	**0.4442**	**6.3114**	**5.2199**	**0.0328**	**48.9159**	**0.2091**	**49.1250**	**5.1512**	**0.1924**	**5.3437**	**0.0000**	**2,857.075 9**	**2,857.075 9**	**0.0241**	**0.0000**	**2,857.581 0**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.4549	29.2832	35.0308	0.0589		1.3898	1.3898		1.3895	1.3895	0.0000	5,354.317 8	5,354.317 8	1.5965	0.0000	5,387.843 6
Total	**1.4549**	**29.2832**	**35.0308**	**0.0589**		**1.3898**	**1.3898**		**1.3895**	**1.3895**	**0.0000**	**5,354.317 8**	**5,354.317 8**	**1.5965**	**0.0000**	**5,387.843 6**

3.4 Installing Facilities - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.3802	6.1681	3.9226	0.0301	7.4718	0.2076	7.6794	0.9784	0.1910	1.1694	0.0000	2,672.143 7	2,672.143 7	0.0132	0.0000	2,672.419 9
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0640	0.1433	1.2974	2.6700e-003	4.8299	1.5400e-003	4.8314	0.5171	1.4200e-003	0.5186	0.0000	184.9322	184.9322	0.0109	0.0000	185.1610
Total	**0.4442**	**6.3114**	**5.2199**	**0.0328**	**12.3016**	**0.2091**	**12.5107**	**1.4955**	**0.1924**	**1.6879**	**0.0000**	**2,857.075 9**	**2,857.075 9**	**0.0241**	**0.0000**	**2,857.581 0**

3.4 Installing Facilities - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.8071	31.7382	22.6543	0.0615		1.4192	1.4192		1.3161	1.3161	0.0000	5,497.491 0	5,497.491 0	1.6610	0.0000	5,532.372 5
Total	**2.8071**	**31.7382**	**22.6543**	**0.0615**		**1.4192**	**1.4192**		**1.3161**	**1.3161**	**0.0000**	**5,497.491 0**	**5,497.491 0**	**1.6610**	**0.0000**	**5,532.372 5**

3.4 Installing Facilities - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.3840	5.8277	3.9909	0.0314	28.2019	0.2133	28.4151	3.0503	0.1962	3.2465	0.0000	2,741.7931	2,741.7931	0.0135	0.0000	2,742.0755
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0591	0.1363	1.2299	2.7800e-003	21.6340	1.5800e-003	21.6356	2.1965	1.4600e-003	2.1979	0.0000	185.9609	185.9609	0.0106	0.0000	186.1842
Total	**0.4431**	**5.9640**	**5.2209**	**0.0342**	**49.8359**	**0.2149**	**50.0507**	**5.2468**	**0.1977**	**5.4445**	**0.0000**	**2,927.7540**	**2,927.7540**	**0.0241**	**0.0000**	**2,928.2596**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.5179	30.5598	36.5689	0.0615		1.4504	1.4504		1.4501	1.4501	0.0000	5,497.4844	5,497.4844	1.6610	0.0000	5,532.3659
Total	**1.5179**	**30.5598**	**36.5689**	**0.0615**		**1.4504**	**1.4504**		**1.4501**	**1.4501**	**0.0000**	**5,497.4844**	**5,497.4844**	**1.6610**	**0.0000**	**5,532.3659**

3.4 Installing Facilities - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.3840	5.8277	3.9909	0.0314	7.4800	0.2133	7.6932	0.9814	0.1962	1.1776	0.0000	2,741.793 1	2,741.793 1	0.0135	0.0000	2,742.075 5
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0591	0.1363	1.2299	2.7800e-003	5.0424	1.5800e-003	5.0439	0.5399	1.4600e-003	0.5414	0.0000	185.9609	185.9609	0.0106	0.0000	186.1842
Total	**0.4431**	**5.9640**	**5.2209**	**0.0342**	**12.5223**	**0.2149**	**12.7372**	**1.5213**	**0.1977**	**1.7189**	**0.0000**	**2,927.754 0**	**2,927.754 0**	**0.0241**	**0.0000**	**2,928.259 6**

3.4 Installing Facilities - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.6229	6.9406	5.2814	0.0144		0.3014	0.3014		0.2795	0.2795	0.0000	1,260.825 2	1,260.825 2	0.3884	0.0000	1,268.980 6
Total	**0.6229**	**6.9406**	**5.2814**	**0.0144**		**0.3014**	**0.3014**		**0.2795**	**0.2795**	**0.0000**	**1,260.825 2**	**1,260.825 2**	**0.3884**	**0.0000**	**1,268.980 6**

3.4 Installing Facilities - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0863	1.2139	0.9082	7.3300e-003	28.0530	0.0493	28.1023	2.9963	0.0453	3.0417	0.0000	626.2624	626.2624	3.0800e-003	0.0000	626.3272
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0126	0.0293	0.2650	6.5000e-004	5.0562	3.7000e-004	5.0566	0.5134	3.4000e-004	0.5137	0.0000	41.7013	41.7013	2.3500e-003	0.0000	41.7506
Total	**0.0989**	**1.2433**	**1.1733**	**7.9800e-003**	**33.1093**	**0.0497**	**33.1589**	**3.5097**	**0.0457**	**3.5553**	**0.0000**	**667.9638**	**667.9638**	**5.4300e-003**	**0.0000**	**668.0778**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3546	7.1402	8.5461	0.0144		0.3389	0.3389		0.3388	0.3388	0.0000	1,260.8237	1,260.8237	0.3884	0.0000	1,268.9791
Total	**0.3546**	**7.1402**	**8.5461**	**0.0144**		**0.3389**	**0.3389**		**0.3388**	**0.3388**	**0.0000**	**1,260.8237**	**1,260.8237**	**0.3884**	**0.0000**	**1,268.9791**

3.4 Installing Facilities - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0863	1.2139	0.9082	7.3300e-003	7.3311	0.0493	7.3804	0.9274	0.0453	0.9727	0.0000	626.2624	626.2624	3.0800e-003	0.0000	626.3272
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0126	0.0293	0.2650	6.5000e-004	1.1785	3.7000e-004	1.1789	0.1262	3.4000e-004	0.1265	0.0000	41.7013	41.7013	2.3500e-003	0.0000	41.7506
Total	**0.0989**	**1.2433**	**1.1733**	**7.9800e-003**	**8.5096**	**0.0497**	**8.5593**	**1.0535**	**0.0457**	**1.0992**	**0.0000**	**667.9638**	**667.9638**	**5.4300e-003**	**0.0000**	**668.0778**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4686	2.8511	9.8025	0.0297	21.0000	0.0616	21.0616	2.4156	0.0568	2.4724	0.0000	2,129.3517	2,129.3517	0.0726	0.0000	2,130.8752
Unmitigated	0.4686	2.8511	9.8025	0.0297	21.0000	0.0616	21.0616	2.4156	0.0568	2.4724	0.0000	2,129.3517	2,129.3517	0.0726	0.0000	2,130.8752

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	91.48	91.48	91.48	5,123,300	5,123,300
Total	91.48	91.48	91.48	5,123,300	5,123,300

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	165.00	165.00	165.00	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.430508	0.067211	0.179601	0.158948	0.055588	0.008829	0.007083	0.074939	0.001126	0.001023	0.009830	0.000656	0.004657

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.7051	0.0156	1.6919	1.3000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003	0.0000	3.2691	3.2691	8.7700e-003	0.0000	3.4532
Unmitigated	0.7051	0.0156	1.6919	1.3000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003	0.0000	3.2691	3.2691	8.7700e-003	0.0000	3.4532

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2120					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3339					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.1592	0.0156	1.6919	1.3000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003	0.0000	3.2691	3.2691	8.7700e-003	0.0000	3.4532
Total	**0.7051**	**0.0156**	**1.6919**	**1.3000e-004**		**6.0700e-003**	**6.0700e-003**		**6.0700e-003**	**6.0700e-003**	**0.0000**	**3.2691**	**3.2691**	**8.7700e-003**	**0.0000**	**3.4532**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2120					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3339					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.1592	0.0156	1.6919	1.3000e-004		6.0700e-003	6.0700e-003		6.0700e-003	6.0700e-003	0.0000	3.2691	3.2691	8.7700e-003	0.0000	3.4532
Total	**0.7051**	**0.0156**	**1.6919**	**1.3000e-004**		**6.0700e-003**	**6.0700e-003**		**6.0700e-003**	**6.0700e-003**	**0.0000**	**3.2691**	**3.2691**	**8.7700e-003**	**0.0000**	**3.4532**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
Total		0.0000	0.0000	0.0000	0.0000

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

PROJECT: SolarPV w/ tracker in Riv East @ 34.1% cap factor [~~20% cap factor during peak hours and ~~remainder% when conventional peaking resources are not generating.

Average Annual Emissions Equivalent (metric tonnes CO_2)	605,095
Total kWh Savings	7,854,049,632
Avoided Emissions Displacement Factor (kg CO_2/MWh)	385

(typ annual MWh)
1,569,950

Inputs:

Generator Size (kW)	500,000
Off-Peak Capacity Factor (Percentage)	36.3%
Off-Peak Export (Percentage)	100%
On-Peak Capacity Factor (Percentage)	20.0%
On-Peak Export (Percentage)	100%
Total Capacity Factor	34.1%

Year	Estimated Energy Generation				Annual Total (mmBtu)	Annual Total (metric tonnes CO_2)
	Export		Onsite			
	Load Following (kWh)	Peaking (kWh)	Load Following (kWh)	Peaking (kWh)		
2014	1,545,421,680	24,528,000	-	-	11,418,408	605,975.25
2015	1,545,421,680	24,528,000	-	-	11,406,993	605,369.47
2016	1,549,655,712	24,595,200	-	-	11,426,799	606,420.58
2017	1,545,421,680	24,528,000	-	-	11,384,164	604,157.91
2018	1,545,421,680	24,528,000	-	-	11,372,749	603,552.14
Totals	7,731,342,432	122,707,200	-	-	57,009,113	3,025,475

Appendix F

Noise and Vibration Calculations

Noise Source Levels and Composite Levels

Project Number: 3291.002
Project Name: palen solar

Model Description: Composite Noise Level Calcs, No Shielding

Model Approach and Cite: FTA, 2006: Transit Noise and Vibration Impact Assessment Guidelines. Table 12-1
Use Factors: FHWA, 2006: Roadway Construction Noise Model, User's Guide. Table 1.

Project Construction Noise

	Loudest Equipment	Lmax (dBA)	Acoustic Use Factor (%)	Leq(h) (dBA)	Individ SPL(h)	Refc (ft)	Leq(h) at Refc (dBA)	Leq(h) at __ (ft) 300 (dBA)
Single Source Result	Composite >>>>>>>>>>>>>>					50	89.0	73.45
	Vibratory Pile Driver	96	20	89.0	8.0E+08			

	Equipment	Lmax (dBA)	Acoustic Use Factor (%)	Refc (ft) 50 Leq(h) (dBA)	Receptor (ft)	Leq at Recept (dBA)	Composite at Receptor Individ SPL(h)	Composite at Receptor Leq(h) (dBA)
Activity Composite of Sources	Composite >>>>>>>>>>>>>>							71.75
	Jackhammer	88	20	81.0	400	62.9	2.0E+06	
	Concrete Mixer Truck	85	40	81.0	420	62.5	1.8E+06	
	Excavator or Grader	85	40	81.0	420	62.5	1.8E+06	
	Vibratory Pile Driver	96	20	89.0	460	69.7	9.4E+06	

Project Operational Noise

	Equipment	Lmax (dBA)	Acoustic Use Factor (%)	Leq(h) (dBA)	Individ SPL(h)	Refc (ft)	Leq(h) at Refc (dBA)	Leq(h) at __ (ft) 300 (dBA)
Single Source Result	Composite >>>>>>>>>>>>>>					3.28	63.0	23.78
	Tracker motor (drive unit)	63	100	63	2.0E+06			

	Equipment	Lmax (dBA)	Acoustic Use Factor (%)	Refc (ft) 32.81 Leq(h) (dBA)	Receptor (ft)	Leq at Recept (dBA)	Composite at Receptor Individ SPL(h)	Composite at Receptor Leq(h) (dBA)
Activity Composite of Sources	Composite >>>>>>>>>>>>>>							54.28
	Inverter w Enclosure	66	100	66.0	200	50.3	1.1E+05	
	Inverter w Enclosure	66	100	66.0	200	50.3	1.1E+05	
	Inverter w Enclosure	66	100	66.0	400	44.3	2.7E+04	
	Inverter w Enclosure	66	100	66.0	400	44.3	2.7E+04	

Vibration Source Levels, Construction

Project Number: 3291.002
Project Name: palen solar

Model Approach and Cite: FTA, 2006: Table 12-2
Reference Source (at 25 ft): PPV 0.170 in/sec , Pile Driver (sonic)
Reference Source (at 25 ft): Lv 93 VdB, Pile Driver (sonic)

Vibration Assessment
FTA, 2006: p 12-11

	D (ft) =	ppv(eq) =	Building Damage (over 0.5 in/sec)	Lv(D) =	Human Annoyance (over 80 VdB)
(ref)	25	0.170 in/sec	No	93.0 VdB	Yes
At 50 feet	50	0.060 in/sec	No	84.0 VdB	Yes
At 100 feet	100	0.021 in/sec	No	74.9 VdB	No
At 200 feet	200	0.008 in/sec	No	65.9 VdB	No
At 300 feet	300	0.004 in/sec	No	60.6 VdB	No
At 500 feet	500	0.002 in/sec	No	54.0 VdB	No

Appendix G

Water Supply Assessment

Water Supply Assessment

Prepared by Philip Lowe, P.E.
Aspen Environmental Group

July 2017

Contents

Tables

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1. Introduction

The objective of this report is to provide a Water Supply Assessment (WSA) pursuant to the requirements of California Senate Bill (SB) 610/221, for the Palen Solar Project. This project was previously proposed as a solar trough project, the Palen Solar Power Project, and later as a solar power tower project, the Palen Solar Electric Generating System.

SB 610, passed in 2002, amended the California Water Code to require detailed analysis of water supply availability for certain types of development projects, and to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 requires detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of specified large development projects. This information is to be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects. The companion measure to SB 610, SB 221, applies to residential subdivisions, and does not apply to the Palen Solar Project. Both measures recognize local control and decision making regarding the availability of water for projects and the approval of projects.

2. Project Location and Description

The Palen Solar Project would be located entirely on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM), located in Riverside County, California approximately 10 miles east of the unincorporated community of Desert Center and north of Interstate 10. The project is within the jurisdiction of the BLM Palm Springs South Coast Field Office, and is within the Riverside East Solar Energy Zone (Riverside East SEZ) of BLM's Western Solar Plan. The project location is shown in Figure 1, Chuckwalla Valley Regional Groundwater Basins. All figures are included at the end of the document.

The Palen Solar Project would use a single-axis tracking system and may use various PV technologies, including, but not limited to Crystalline Silicon panels or Copper Indium Gallium Selenide panels. The output of the facility is proposed to be 500 MW (AC) and would produce approximately 1,598,683 MWh a year of renewable energy. Construction is scheduled to commence fall 2017, with completion 30 months later. The project would cover an area of 4,200 acres, and include the following components:

- a single solar field with two smaller adjacent solar fields for a total of 3 solar fields;
- two-hundred (200) power blocks of electrical generating capacity of 2.50 MW each for a combined capacity of 500 MW;
- one project electrical switchyard;
- common facilities area that would include an administrative and maintenance building;
- up to 10 groundwater wells;
- one temporary construction laydown area;
- a roadway system consisting of internal and perimeter roadways;

- a main access road from the I-10/Corn Springs Road interchange;
- a single circuit 230 kV generation tie-line electric transmission line extending from the project electricity switchyard to the Red Bluff Substation; and
- a redundant telecommunications cable installed beneath the roadway along the gen-tie route.

In order to estimate water usage for the Palen Solar Project, the project developer reviewed estimates for water usage provided by EPC Contractors on similar projects and publicly available information of actual water usage on a nearby project of similar size and technology. The summarized data from this review supported the estimated water usage for the Palen Solar Project. Total water use for the project's construction is estimated at 1,242 to 1,750 acre-feet, equating to 497 to 700 acre-feet per year (afy) during the anticipated 30-month construction period. Operational water use is estimated at 15 to 41 afy for panel washing and general maintenance activities. The applicant initially assumed water supply would be one of two planned scenarios:

> **Water Supply Scenario 1:** Over a 30-month period, up to 80% (560 afy) of construction water would be purchased from two wells operated by the Riverside County Service Area (CSA) 51 in Lake Tamarisk, at Desert Center, approximately 10 miles west of the project site. The water would be transported from Lake Tamarisk to the project site by truck. The remaining 20% or more of construction water would come from 2 onsite wells on the Palen Solar Project property. All operational water would be produced from the same on-site wells.
>
> **Water Supply Scenario 2:** All construction and operational water would be supplied from up to 10 onsite wells. Water trucks would transport water from the onsite wells utilizing the internal roads within the project boundary.

Both scenarios would obtain water from the same source: the Chuckwalla Valley Groundwater Basin (CVGB), described in Section 4. This analysis therefore treats each scenario the same in terms of water balance for the CVGB. However, Water Supply Scenario 1 requires additional analysis as to the capacity of CSA 51 to serve project demands.

CSA 51 has two groundwater wells that pump at rates of 1,100 gallons per minute (gpm) and 1,200-1,500 gpm, respectively, with water stored temporarily in Lake Tamarisk. Both wells typically operate on a 10-hour workday, five days a week. The lower volume well can pump 660,000 gallons in a typical workday, and the higher volume well can pump 720,000-900,000 gallons in a typical workday, for a combined maximum of 1,560,000 gallons per working day.

In 2015, CSA 51 withdrew a total of 786 acre-feet to meet community needs, and sold no water outside the community. Based on the 10-hour workday and 5-day workweek described above, community demands in 2015 therefore required the two wells to pump a combined 985,000 gallons per day. Based on communications with CSA 51, community demands during the Palen 30-month construction period are anticipated to be roughly the same as they were in 2015. CSA 51 will not be selling to any other water users outside the community during this period.

Under Water Supply Scenario 1, the maximum possible project demand from CSA 51 is 80% of 700 afy, or 560 afy, during the 30-month construction period. Based on the 10-hour workday, 5-day workweek described above, the project could therefore demand up to 702,000 gallons per day from CSA 51 during that time. The sum of the estimated community demand and the maximum possible project demand is 1,687,000 gallons per day, which exceeds the two wells' daily

combined maximum pumping capacity by about 127,000 gallons per day. Therefore, CSA 51 may not be able to supply the project's demands under Water Supply Scenario 1 without either compromising existing supply obligations to the community or extending the workday or workweek.

Based on these assumptions, pumping 1,687,000 gallons per day may exceed CSA pumping limitations and could result in a localized drawdown. However, CSA 51 has communicated that it has never had a problem continuing to pump despite some drawdown, even when pumping large volumes. Surrounding landowners recall that localized drawdown effects have always been minimal and have rebounded within a few months. Therefore, it is assumed that the impact of drawdown on CSA 51's capacity to supply the Palen Solar Project would be negligible.

Considering the above analysis of CSA 51's capacity to supply the project under the 80% scenario, the applicant intends to decrease its proposed purchase of CSA 51 water. Under **Revised Water Supply Scenario 1**, the applicant would purchase up to 30% of construction water from CSA 51, and obtain the remaining 70% or more from up to 7 onsite wells. At a maximum construction water use of 700 afy, 30% is 210 afy, which is approximately 263,000 gallons per day based on a 5-day workweek. The sum of estimated community demand and this revised maximum project demand is 1,248,000 gallons per day, which is under the minimum and maximum combined well output by approximately 132,000 and 312,000 gallons per day, respectively. CSA 51 therefore has capacity to serve project needs under this 30% scenario. Pumping 1,248,000 gallons per day over a 30-month period, based on the assumptions articulated above, would not compromise existing water users. Accordingly, the CSA 51 wells should be able to continue pumping at this rate throughout the construction period. Based on historical information provided by CSA, any local drawdown resulting from the temporary increase in pumping is expected to rebound after construction is complete.

Neither the Revised Water Supply Scenario 1 nor Water Supply Scenario 2 would require the construction of new or expanded water supply infrastructure aside from well improvements and distribution infrastructure that may need to be constructed as part of the project and within the project boundary by the project proponent. Revised Water Supply Scenario 1, which would rely in part on an existing water supplier, CSA 51, would require no new CSA 51 infrastructure. Water trucks serving the project during construction would be filled from existing infrastructure owned and operated by CSA 51.

3. SB 610 Overview and Applicability

SB 610 requires that a project be supported by a WSA if the project is subject to the California Environmental Quality Act, and would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project. According to SB 610 Guidelines, one dwelling unit typically consumes 0.3 to 0.5 afy, which would amount to 150 to 250 afy for 500 units. Projects must analyze whether the total projected water supplies determined to be available for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses. Averaged over the 30-year project lifespan, the Palen Solar Project would use 84.6 acre feet per year.

Senate Bill 267 (SB 267), signed into law in 2011, amended California's Water Law to revise the definition of "project" specified in SB 610. Under SB 267, wind and photovoltaic projects which consume less than 75 afy of water are not considered to be a "project" under SB 610, in which case a WSA would not be required. The Project's average 30-year water use of 84.6 afy is above this threshold. It is therefore assumed that the Palen Solar Project is not exempted from SB 610 by SB 267.

4. Chuckwalla Valley Groundwater Basin

4.1 Basin Overview and Storage

All water for the Palen Solar Project will come from the CVGB. The CVGB covers an area of 940 square miles in eastern Riverside County, California. The basin underlies the Palen and Chuckwalla Valleys and is bounded by consolidated rocks of the Chuckwalla, Little Chuckwalla, and Mule Mountains on the south, of the Eagle Mountains on the west, and of the Mule and McCoy Mountains on the east. The Coxcomb, Granite, Palen, and Little Maria Mountains bound the valley on the north and extend ridges into the valley. There are no perennial streams in Chuckwalla Valley. Palen, Ford, and several smaller dry lakes are found in topographic low-points (CDWR, 2004). The surface watershed contributing to the area of the CVGB is 1,344 square miles (CEC, 2010), comprised of the Chuckwalla Valley (940 square miles) and the surrounding bedrock mountains (404 square miles).

Water-bearing units of the CVGB include Pliocene to Quaternary age continental deposits divided into Quaternary alluvium, the Pinto Formation, and the Bouse Formation. Figure 2a, Regional Geology, and Figure 2b, Regional Geology Legend, show the geology of the area. Bedrock is as deep as 5,000 feet below ground surface in the eastern portion of the CVGB (see Figure 3, Chuckwalla Valley Groundwater Basin Bedrock Topography). At the Palen Solar Project, wells extended to a depth of approximately 800 feet below the ground surface as shown in Figure 4, Chuckwalla Valley Groundwater Basin Cross Section A-A (See Figure 2a for the location of the cross section shown in Figure 4). The average specific yield of the upper 500 feet of unconsolidated sediments is estimated to be 10 percent (CDWR, 2004). Specific yield is a measure of the capacity of the aquifer to release water in terms of the volume of water per unit volume of aquifer that can be released by pumping. Total groundwater storage available to wells was originally estimated at 9,100,000 acre-feet (af), and more recently at 15,000,000 af (CDWR, 2004, CDWR, 1979). The estimate of 15,000,000 af was made by the CDWR based on multiplying specific yield times saturated thickness times basin size. Saturated thickness was obtained by subtracting the average depth to water from the average thickness of alluvial sediments, or 500 feet, whichever is smaller (CDWR, 1979). The 15,000,000 estimate, being the more recent, is used in this analysis.

The CVGB is located within the jurisdiction of the Colorado River Basin Regional Water Quality Control Board (RWQCB), and is subject to management direction of the Water Quality Control Plan (Basin Plan) for the Colorado River Basin (Region 7). The CVGB is bordered by the Orocopia Valley groundwater basin on the west, the Palo Verde Mesa Groundwater Basin on the east, the Cadiz Valley and Ward Valley Groundwater Basins on the north, and the Pinto Valley

Groundwater Basin on the northwest (Figure 1). The extent of hydrological connectivity between these basins and the CVGB is discussed in sections 4.4 and 4.5 below.

Groundwater Management

The CVGB is an unadjudicated groundwater basin. Owners of property overlying the basin have the right to pump groundwater from the basin for reasonable and beneficial use, provided that the water rights were never severed or reserved. Groundwater production in the basin is not managed by an entity and no groundwater management plan has been submitted to the California Department of Water Resources (CDWR, 2016). There is no Urban Water Management Plan for the area, and there is no Integrated Regional Water Management Plan.

The Colorado River Water Use Plan by the Colorado River Board of California (CRBC, 2000), has studied a proposal for storing Colorado River water in the CVGB. According to the Colorado River Water Use Plan, the CVGB has the capacity to store up to 1.2 million acre feet of water in the northern portion of the valley. Stored water would be returned to the Colorado River Aqueduct. While the potential exists in this basin, further study would be necessary to determine the feasibility for developing a storage program. The effect that such a storage program would have on the project is discussed in section 5.3 below.

4.2 Climate

The climate in the area of the CVGB is arid with high summer temperatures and mild winter temperatures. At nearby Eagle Mountain, approximately 16 miles northwest of the Palen Solar Project, annual precipitation is 3.67 inches. Average annual precipitation in the project area, based on the gauging station at the nearby Blythe, California, airport, is 3.55 inches as reported by the Western Regional Climate Center (WRCC, 2016). Average summer maximum temperatures are above 100 degrees. Precipitation is seasonal. August is the wettest month due to summer thunderstorms. January is the second wettest month, due to winter rains. Snowfall is negligible (WRCC, 2016).

4.3 Groundwater Trends

Groundwater levels range from the ground surface to about 400 feet below ground surface (RWQCB, 2006). Groundwater contour data from 1979 shows that CVGB groundwater moves from the north and west toward the gap between the Mule and McCoy Mountains at the southeastern end of the valley. Groundwater levels were stable up to about 1963 (CDWR, 2004). The CDWR reported total groundwater extraction of 9,100 afy in 1966.

The direction of groundwater movement is not expected to have changed since 1979, but there have been changes in groundwater levels, especially localized around areas of significant extraction. For example, data from wells within the Desert Center area show a period of water level decline from the mid-1980s through the early 1990s during periods of expanded agricultural operations when combined pumping exceeded 20,000 afy, well above historic water usage for the western portion of the basin (AECOM 2011).

The National Park Service has noted that groundwater levels throughout the CVGB appear to have been trending downward for several decades (BLM, 2012). Most wells in the CVGB have not

been used for monitoring data such as groundwater level trends since the 1980s; however, several wells have been used to collect groundwater data for the past 25 years, and these data show that groundwater level trends have been fairly stable in the eastern CVGB, and rising slowly back towards pre-agricultural pumping groundwater levels in the western CVGB, while dropping slowly but steadily only in the central CVGB. This is illustrated in Figure 5, Basin Wide Groundwater Hydrographs, which shows hydrographs for selected wells within the CVGB from 1958 to 2009.

Wells in the area of Desert Center (Wells 32M1 (548), 7P1 (598), 7M1 (604), and 12N1 (671)) generally show declines between about 1980 and the early 1990s, attributable to increased agricultural pumping. This pumping declined significantly after 1986, and local groundwater levels have recovered to approximately those of the early 1960s (AECOM, 2011). This is indicated in the recovery in the early 1990s for Wells 7P1 (598), 7M1 (604) and 12N1 (671) (Figure 5). The groundwater water level at and north of the area of the Palen Solar Project (see Wells 6C1 (500), 19Q1 (538) and 33N1 (592) in Figure 5) has been generally stable over the last 40 years with slight declines.

The well data is not continuous. For instance, the graph for Well 33N1 (592) (Figure 5) appears to show a slight but steady decline from about 1970 to 2009. However, there are no reference points between those dates, and it is possible that most or all of that decline occurred in response to the high agricultural extractions in the mid-1980s to the early 1990s. As the Desert Center wells show an upward trend after the agricultural extractions ended, it is possible that groundwater in the area of the Palen Solar Project will slowly recover.

Well 18H1 (493) in the eastern part of the basin shows a decrease in water level elevation between 1985 and 1990, likely due to increased water use at during the construction of the Chuckwalla Valley and Ironwood Prisons (CEC, 2010), while Well 14H1 (546), also in the eastern part of the basin, shows an increase in groundwater level between about 1985 and 2000.

It is noteworthy that most of the long-term monitoring wells in the CVGB are situated within agricultural or prison operations, complicating extrapolation of any local drawdowns shown in those data to the 940 square mile CVGB as a whole due to the site-specificity of those wells' cones of depression (a "cone of depression" refers to drawdown which occurs in a well when it is pumped, causing a conical-shaped gradient in the surrounding aquifer that results from water flowing from areas of high to low pressure; when two or more cones of depression intersect each other, the effect on drawdown (increasing depth to groundwater) is combined and water table levels drop substantially) (BLM 2012).

In general, the data show a relatively stable groundwater surface, interrupted locally in the past mainly by agricultural pumping. Local groundwater levels show evidence of rising after the agriculture-related drawdown of the 1980s ended, indicating that local extraction rates have not exceeded recharge. Since groundwater levels were reported as stable in 1963 (CDWR, 2004), an extraction rate of roughly 9,100 afy may be a sustainable safe yield.

The groundwater level trends derived from the available data show a general trend toward stability, but the analysis is inconclusive because the data are not complete, there are gaps in the record, and well locations do not cover the entire CVGB. The monitoring wells that show the most prominent historic declines are in agricultural or prison areas where a local drawdown would occur from intense use, but would not necessarily be representative of the CVGB as a whole. For instance,

Wells 546 and 500, which are outside the main areas of extraction, show a steady or rising water surface.

4.4 Groundwater Recharge

Recharge to the CVGB occurs from subsurface inflow from other groundwater basins, infiltration of precipitation, irrigation return flow, and wastewater return. Leakage from the Colorado River Aqueduct has also been identified as a possible source of inflow.

Subsurface Inflow

Groundwater in the CVGB generally flows west to east. Subsurface inflow originates from the Pinto Valley and Orocopia Valley groundwater basins, which are west of the CVGB. Although the California Department of Water Resources has hypothesized that underflow from the Cadiz Valley Groundwater Basin may enter the CVGB (CDWR, 2004), Cadiz Valley and Ward Valley Groundwater Basins are not considered to contribute to the CVGB (BLM, 2011).

The amount of inflow from the Pinto Valley and Orocopia Valley Groundwater Basins is uncertain, and there have been a wide range of estimates from different experts. The results of several studies on CVGB recharge from subsurface inflow are shown in Table 1.

Table 1. Subsurface Inflow Recharge Estimates for the Chuckwalla Valley Groundwater Basin

Study	Recharge from Inflow from the Pinto Valley and Orocopia Valley Groundwater Basins (acre-feet per year)
Genesis Solar Project EIS[1]	3,500
Eagle Mountain Draft EIR[1]	6,700
Palen Solar Power Project EIS[1]	3,500
Eagle Mountain Draft EIS[1]	6,575
National Park Service (NPS)[1]	953–1,906
Argonne National Laboratory[2]	1,595

1 - Source: BLM, 2012
2 - Source: Argonne, 2013

The California Energy Commission (CEC, 2015) reported an estimated inflow of 3,173 afy from the Pinto Valley Groundwater Basin, and 1,700 afy from the Orocopia Groundwater Basin. CEC also reported that recent studies by GeoPentech estimated the inflow from the Orocopia Groundwater Basin as low as several hundred afy. The CEC therefore used 3,500 afy as an estimate for the total inflow into the CVGB in analyzing the Palen Solar Power Project. The NPS estimate was based on groundwater modeling by the U.S. Geological Survey (USGS) on the Warren, Joshua Tree, and Copper Mountain groundwater basins. These basins are not adjacent to the CVGB, and the groundwater model used is subject to a high level of uncertainty due to simplified assumptions and model inputs. Nevertheless, the NPS estimate compares well to the estimate reported by Argonne. The Eagle Mountain estimates were based on a 1996 report on environmental impacts of the Eagle Mountain Landfill.

Overall, there is substantial uncertainty regarding inflow from the adjacent groundwater basins. For purposes of this analysis, the groundwater budget uses the 3,500 afy used in the Palen Solar

Power Project EIS. This estimate has been used for several projects in the past, and it is more recent than the Eagle Mountain Estimate. Additionally, it is approximately in the middle of the range of estimates given in Table 1. The analysis herein also applies the NPS low estimate of 953 afy to provide a probable range for the groundwater budget given the uncertainties involved.

Recharge from Precipitation

Infiltration recharge to the CVGB by precipitation is difficult to assess due to lack of reliable data and the aridity of the area. There has been a wide range of estimates by experts in support of other projects or agencies. The CDWR has not published an estimate.

Generally, precipitation recharge has been estimated as a percentage of total precipitation. The CVGB receives annually about 258,000 afy total rain (CEC, 2015). Most analysts note that studies published by the BLM indicate that 7 to 8 percent of the precipitation that falls on the bedrock mountain fronts ends up as groundwater recharge (BLM, 2012), while a smaller percentage of the valley floor precipitation makes it to the groundwater. For the CVGB, 7 to 8 percent of the precipitation that falls on the mountain fronts would be equivalent to 3 percent of the total precipitation that falls on the total CVGB watershed (BLM, 2012). The CEC, using estimates of 3, 5 and 7% of total incident precipitation ending up as groundwater recharge, and overlaying isohyetal precipitation maps over the entire CVGB watershed to estimate precipitation distribution and bedrock characteristics by sector, estimated precipitation-related recharge to be 8,588, 14,313, and 20,038 afy, respectively, and recommended using 8,588 afy (about 3% of total precipitation) for the groundwater budget analysis (CEC, 2015). These results are supported by the findings of a study presented in a USGS report on groundwater recharge in the arid and semiarid southwestern United States (USGS 2007), which gave a range of approximately 3 to 7 percent of total precipitation for the Mojave Desert, depending on the amount of precipitation received. In the 2007 study by the USGS, the lower (3 percent) estimate represented years with below-average precipitation, with the higher (7 percent) estimate for above-average precipitation. The percentage changes with the amount of precipitation because most recharge occurs from runoff, and runoff is generally higher in years with greater precipitation.

The results of several studies on CVGB recharge from precipitation are shown in Table 2.

Table 2. Precipitation Recharge Estimates for the Chuckwalla Valley Groundwater Basin

Study	Recharge from Precipitation (acre-feet per year)
Genesis Solar Project EIS[1]	9,448
Eagle Mountain Draft EIR[1]	5,500
Palen Solar Project EIS[1]	8,588
Eagle Mountain Draft EIS[1]	6,125
National Park Service (NPS)[1]	2,060–6,125
Argonne National Laboratory[2]	3,200

1 - Source: BLM, 2012
2 - Source: Argonne, 2013

The NPS study in Table 2 was based on groundwater modeling by the U.S. Geological Survey (USGS) on the Warren, Joshua Tree, and Copper Mountain groundwater basins described above.

These results are subject to a high level of uncertainty due to simplified assumptions and model inputs, and the fact that the modeled basins are not adjacent to the CVGB. The results of the study were extrapolated to the CVGB, which was not studied directly (BLM, 2012).

The Palen Solar Project and Genesis Solar Project estimates were based on a percentage of precipitation entering groundwater after a study of groundwater basins in nearby desert basins which estimated recharge rates from 3 to 5 percent of total precipitation (CEC, 2015). The Argonne estimate is based on a reported recharge rate for the adjacent Palo Verde Mesa Groundwater Basin extrapolated to the CVGB.

GEI consultants, in a study conducted in response to NPS comments on the Eagle Mountain Pumped Storage Project (FERC, 2012) used the Maxey-Eakin method of modeling natural groundwater recharge rates, and a Metropolitan Water District (MWD) Review panel method. The Maxey-Eakin method predicted total recharge values from 600 to 3,100 afy, while the MWD Review Panel method predicted recharge ranging from 7,600 to 17,700 afy. GEI concluded that the MWD Review Panel method was the more reliable for the reason that the Maxey-Eakin method has been found to underestimate recharge rates.

As noted in the Desert Harvest WSA (BLM, 2012), the NPS contends the annual streamflow recharge rates simulated by the USGS may be two to ten times greater than the actual streamflow, suggesting that the USGS recharge rates may be as low as one tenth those given in Table 2, or only 206 to 612 afy. These estimates would be closer to those estimated by the Maxey-Eakin method. Recharge rates that low would mean that only about one tenth of one percent of total precipitation goes to groundwater recharge, well below the 3 to 7 percent published by the USGS (2007).

In summary, there is high uncertainty regarding the amount of precipitation-related recharge to the CVGB, and substantial disagreements among experts, with estimates presented herein ranging from 2,060 afy to 9,448 afy, and possibly even lower, or higher. For purposes of this analysis, the groundwater budget uses 8,588 afy. This is equivalent to 3 percent of the total average precipitation of 258,000 af, and is supported by the USGS 2007 study for which 3 percent would represent the estimated recharge for a below-average precipitation year. The analysis also applies the NPS low estimate of 2,060 afy, representing about (0.7 percent of average annual precipitation) to provide a probable range for the groundwater budget given the uncertainties involved.

Irrigation Return Recharge

Irrigation water applied to crops within the CVGB has the potential to infiltrate to groundwater depending on the amount and method of irrigation, soils, crop type, and climate. The CEC estimated irrigation return recharge as 10% of total irrigation volume as determined by a 2010 study (WorleyParsons, 2009), and determined that 800 afy would reach the CVGB (CEC, 2010). This was based on a total irrigation volume of 7,700 afy (6,400 afy for agriculture, 215 afy for aquaculture pumping, and 1,090 afy for Tamarisk Lake).

Wastewater Return Flow

Wastewater return flow within the CVGB originates from the Chuckwalla State Prison, the Ironwood State Prison, and the Lake Tamarisk development near Desert Center (CEC, 2010, WorleyParsons, 2009). The prisons use an unlined pond to dispose of treated wastewater, and it

is estimated that 795 afy infiltrates to the CVGB (WorleyParsons, 2009). Another 36 afy is estimated to originate from Lake Tamarisk, for a total of 831 afy (WorleyParsons, 2009).

Colorado River Aqueduct

Leakage from the Colorado River Aqueduct, which runs across the western edge of the CVGB, has not been documented, but was hypothesized by the Argonne National Laboratory in a 2013 study of the Riverside East Solar Energy Zone (Argonne, 2013). Argonne estimated a 2,000 afy contribution to the CVGB from the aqueduct based on measured leakage rates from the Central Arizona Project in Arizona. Since this recharge component is not well documented, and if it does occur the use of it would require entitlement, it is not used in this analysis.

4.5 Groundwater Demand/Outflow

Outflow from the CVGB occurs from subsurface outflow to the Palo Verde Mesa Groundwater Basin, groundwater extraction for agriculture and other uses, and evapotranspiration from Palen Dry Lake. Outflow also occurs, or will occur, from the Palen Solar Project and other existing and proposed projects that are addressed in Section 5 of this document.

Subsurface Outflow

Subsurface outflow from the CVGB is to the Palo Verde Mesa Groundwater Basin, and has been variously estimated as ranging from 400 afy to 1,162 afy (CEC, 2015). Argonne (Argonne, 2013), in their 2013 study of the basin, assumed zero subsurface outflow, with no justification given. Using gravity data, Wilson and Owens-Joyce (1994) found that the area through which discharge occurs is significantly more limited than previously thought due to the presence of a buried bedrock ridge, though the discharge pathway was not indicated to be completely closed. Since this discovery was made after the 1,162 afy estimate was made (which was in 1990), the lower estimate of 400 afy outflow was adopted for this study.

Groundwater Extraction

Current and historical groundwater extraction in the CVGB includes agricultural water use, pumping for Chuckwalla and Ironwood State Prisons, pumping for the Tamarisk Lake development and golf course, domestic pumping, and a minor amount of pumping by Southern California Gas Company (CEC, 2010). The California Department of Water Resources, using data from 2005 to 2010, estimated the total amount of pumping at 4,700 afy for the entire CVGB (CDWR, 2015). Argonne (Argonne, 2013), also using California Department of Water Resources data, estimated 5,100 afy. Other recent studies have given higher estimates. Specifically, the Palen Solar Power Project EIS and CEC staff assessment for the Palen Solar Power Project, both used 10,361 afy (BLM, 2011, CEC, 2015). AECOM, in a previous WSA for the Palen Solar Power Project (AECOM, 2010) estimated 5,745 to 7,415 afy, with no source given. For purposes of this analysis, the most-recent estimate of 10,361 afy is used as a reasonable upper estimate of total extraction, as was used by the BLM and CEC.

The Genesis Solar Electric Plant and the First Solar Desert Sunlight Solar Farm have been recently completed in the area, and these projects will use 218 afy groundwater for operations (218 afy for

Genesis[1], and 0.3 afy for First Solar, with the total rounded to 218). Total baseline groundwater extraction is therefore 10,579 afy for purposes of this study.

Evapotranspiration at Palen Dry Lake

USGS mapping of groundwater flow and mapping in the area did not identify Palen Dry Lake as an area where groundwater discharges at the ground surface (CEC, 2015). Nevertheless, groundwater elevation contour mapping suggests that groundwater may occur near the ground surface beneath approximately the northwestern 25% of Palen Dry Lake. Groundwater levels in this well were reported to be approximately 20 to 25 feet below the ground surface between 1932 and 1984. Given that the surface elevation at Palen Dry Lake two miles to the south is approximately 460 feet msl, or 40 feet lower, it is possible that groundwater levels are very close to the ground surface beneath the northern portion of the playa (CEC, 2010). Data summarized by the CEC (CEC, 2010) suggest it is possible that part of the northern portion of Palen Dry Lake is discharging groundwater by evaporation as a wet playa.

The presence of groundwater-dependent vegetation along the margins of Palen Dry Lake is another indicator that groundwater may be lost through evapotranspiration. There are mesquite tree groves along the margins of Palen Dry Lake, woodland habitat along dry desert washes, stands of jackass clover, and desert/alkali sink scrub habitats along the margins of the dry lake (BLM, 2011a). The mesquites can be phreatophytes with deep roots that tap into groundwater, but do not necessarily require groundwater to survive. A groundwater depth of 20 to 25 feet would be well within the reach of mesquite tap roots. The presence of this vegetation is an indicator, but not necessarily proof, that evapotranspiration is occurring.

Worley-Parsons visited the Palen Dry Lake in December of 2009 and found intermittent salt deposits at the northwestern portion of the dry lake. The salt deposits were concluded to have been formed from evaporation surface water rather than from groundwater. In additional studies of aerial photographs by Worley-Parsons, a 700-acre salt pan was indicated at the northwest portion of the dry lake. The salt pan could be evidence of evaporation of groundwater. Review of historical imagery found that the occurrence of the salt pan was episodic, and apparently correlated with precipitation events, which could also be responsible for the formations (CEC, 2015).

In December 2009, Worley-Parsons, using hand-augur borings, found free groundwater at a depth of 8 feet below the ground surface at the Palen Dry Lake. This suggests that groundwater could be close enough to rise through capillary action and be lost through evaporation (CEC, 2015).

Salt accumulation at Palen Dry Lake is likely the result of the dissolution and recrystallization of surface salt deposits in response to surface accumulation by rains, although intermittent accumulation from evaporation may occur seasonally. This, plus the proximity of groundwater to the surface in some areas, and the presence of possible phreatophytes, indicates that groundwater loss through evapotranspiration may occur at least episodically and seasonally.

The CEC (CEC, 2015) estimated groundwater discharge rates from the Palen Dry Lake using measured evaporation rates at Franklin Lake Playa in Death Valley, adjusted for differences in the

[1] The Genesis Solar Electric Plant originally proposed to use 1,644 afy groundwater for cooling; however, during the environmental analysis, the applicant revised the project to use dry cooling which required 218 afy. See Genesis Solar Energy Project Commission Decision (CEC-800-2010-011 CMF) pg. 5.

characteristics of the two dry lakes, as a reference. The result was 0.0583 feet of evapotranspiration per month, for three months of the year. Over the 2,000-acre area thought susceptible to groundwater evapotranspiration, this amounts to 350 afy (CEC, 2015).

The CEC estimate should be considered a rough approximation, as it was made based on a Death Valley dry lake with very different characteristics than the Palen Dry Lake. For instance (from CEC, 2015):

- Franklin Lake Playa is a terminal playa, which is the terminal discharge point of the local groundwater flow system; whereas, Palen Lake is a bypass playa, with most groundwater flowing laterally past the playa.
- Franklin Lake Playa includes extensive groundwater discharge features (e.g., saltpan, puffy ground and halophyte wetlands) that are generally less developed or lacking at Palen Lake, indicating less groundwater discharge would be expected at Palen Lake.
- Evapotranspiration rates at wet playas are temperature dependent, with maximum rates occurring during the summer months. Franklin Lake Playa occurs in Death Valley, where mean annual and summer high temperatures typically exceed those at Palen Lake.
- The available data suggest that groundwater discharge, if it is occurring at Palen Lake, is episodic or intermittent; whereas groundwater discharge at Franklin Lake Playa occurs throughout the year.

To compensate for these differences, the CEC used a groundwater discharge rate that was approximately half the Franklin Lake Playa rate. Additional analysis of the Palen Dry Lake would be needed to obtain a more-reliable estimate.

5. Groundwater Budget

The primary question to be answered in a WSA that is compliant with SB 610 requirements is:

> *Will the total projected water supply available during normal, single dry, and multiple dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to existing and planned future uses of the identified water supplies, including agricultural and manufacturing uses?*

In order to determine whether there are sufficient supplies to serve the project over the next twenty years, this section provides a baseline normal-year groundwater budget for the CVGB as a whole, based on the information provided in Section 4.5. This section also includes a normal-year groundwater budget assuming the Palen Solar Project is in place, and a normal-year groundwater budget assuming the Palen Solar Project and all known cumulative projects are in place. The same is repeated for single and multiple dry-year scenarios. The following is an explanation of water budget terms used in this document.

> A **Water Budget** is an identification, estimate, and comparison of the groundwater inputs and outputs that affect the overall trend of groundwater balance in the CVGB. Inputs such as recharge from precipitation, underflow from other groundwater basins, and other sources

are compared to outputs such as loss to other groundwater basins, extractions by humans, and evapotranspiration. Total inflow minus total outflow equals change in storage.

A **Safe Yield** is the amount of water that can be withdrawn from the groundwater basin for human use without depleting the groundwater resource. A safe yield occurs if the groundwater extractions, plus other natural outputs, do not exceed inputs. In this case, there would be no net depletion of the groundwater in storage. In this report, the safe yield is calculated for the basin as a whole.

An **Overdraft** occurs if extractions plus other outputs exceed total inputs, in which case there will be a net loss of groundwater storage over time. In this report, an overdraft, also referred to herein as a deficit, is estimated for the CVGB basin as a whole. Long-term overdraft conditions will result in a protracted diminishment of the groundwater resource that could have effects on the environment and the sustainability of the groundwater use.

The CVGB has a lack of long-term monitoring data for performing a detailed analysis. Wells have been in only a few areas of the basin, are not well documented, and the available data are incomplete and localized. It is known that extractions were 11 afy in 1952 (CDWR, 2004), rising to about 9,100 afy in 1966 (same source), and then peaking at around 20,000 afy for agriculture in the Desert Center area, as described above, resulting in local drawdowns that have since appeared to recover.

As a result of the scarcity of available data, there is substantial uncertainty regarding some of the primary inputs to a groundwater budget. Several studies in recent years for projects such as the Palen Solar Project have used the best available information do draw conclusions, summarized in Table 3. The conclusions herein are based on the same best available information and should be considered in the context of the overall uncertainty regarding the CVGB basin. Because of the uncertainties involved, the analysis uses two groundwater budgets. The first is a best estimate using data that has been widely reported and used in previous studies of this kind as described in Section 4. These adopted data are presented in Table 3. The second uses lower input estimates that have been made by U.S. Government agencies entrusted with management of natural resources in the area, also described in Section 4. Specifically, the second budget uses a recharge from precipitation estimate of 2,060 afy, and an underflow from Pinto Valley and Orocopia Valley Groundwater Basins of 953 afy as recommended by the NPS (BLM, 2012). All other inflow/outflow estimates are the same for both budgets. The two together provide insight into a range of potential outcomes related to groundwater use in the CVGB.

Table 3. CVGB Inflow/Outflow Summary

Inflow/Outflow Component	Range (afy)[1]	Adopted for this Study (afy)	Reason for Adoption/Source
Recharge from Precipitation	+206 to +20,038	+8,588	3 Percent of Total Precipitation USGS (2007), BLM, (2012)
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins	+953 to +6,575	+3,500	Used Previously for Palen and Genesis Projects
Irrigation Return Flow	+800	+800	WorleyParsons (2009)
Wastewater Return Flow	+831	+831	WorleyParsons (2009)

Table 3. CVGB Inflow/Outflow Summary

Inflow/Outflow Component	Range (afy)[1]	Adopted for this Study (afy)	Reason for Adoption/Source
Groundwater Extraction	–4,700 to –10,579	–10,579	Recent Estimate: -10,361 (CEC, 2015) + -218 (Genesis; WorleyParsons, 2009)
Underflow to Palo Verde Mesa Groundwater Basin	–400	–400	CEC (2015). Used lower estimate due to restricted discharge area (Wilson and Owens-Joyce, 1994)
Evapotranspiration at Palen Dry Lake	–350	–350	CEC (2015) estimate from Franklin Playa study.

1 – Inflow is depicted by a '+' sign; outflow is depicted by a '–' sign.
Source: See Section 4

5.1 Baseline Groundwater Budget

The baseline groundwater budget is the groundwater budget for the CVGB in the absence of the proposed project and all other known cumulative projects not already in place. For the purposes of this analysis, agricultural uses are considered as part of the baseline budget, as is the Prison Water Use, and the Genesis Solar Project. There are no manufacturing water uses in the area.

Normal (Average) Year

Table 4 provides a baseline normal groundwater budget for the CVGB based on the adopted information presented in Sections 4.4 and 4.5 and Table 3. This budget indicates a safe yield, which is the maximum quantity of water that can be continuously withdrawn from a groundwater basin without adverse effect. The baseline safe yield for the CVGB is estimated at 2,390 afy (total from Table 4), meaning the basin is currently close to capacity in terms of groundwater extraction. This budget would be for a normal (average) year, in terms of precipitation and water use.

Table 5 provides the same analysis using the lower NPS estimates of precipitation and underflow recharge described in Section 4. This baseline budget shows the CVGB to be in deficit, with a loss of approximately 6,685 afy in the groundwater resource, meaning groundwater levels would be expected to drop as the resource is depleted over the years.

Assuming a 2,390 afy average year surplus, the CVGB would have a surplus of approximately 71,700 af at the end of the 30-year period, meaning the groundwater basin would slowly recover from any deficits that may have been created by high agricultural pumping in the past. A 30-year period is used because that is the expected life of the project. With the NPS infiltration and underflow estimates (Table 5), at the end of the 30-year period the cumulative deficit would be 200,550 af. The basin would not recover losses during that period if the NPS estimates are correct. However, the amount of groundwater available in the CVGB is large, and this cumulative deficit after 30 years would amount to only about one percent of the total estimated storage.

Table 4. Estimated Baseline Groundwater Budget for the Chuckwalla Valley Groundwater Basin

Budget Components	Acre-Feet per Year
Inflow	
Recharge from Precipitation[1]	8,588

Table 4. Estimated Baseline Groundwater Budget for the Chuckwalla Valley Groundwater Basin

Budget Components	Acre-Feet per Year
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins[2]	3,500
Irrigation Return Flow[3]	800
Wastewater Return Flow[4]	831
Total Inflow	13,719
Outflow	
Groundwater Extraction[5]	-10,579
Underflow to Palo Verde Mesa Groundwater Basin[6]	-400
Evapotranspiration at Palen Dry Lake[7]	-350
Total Outflow	-11,329
Budget Balance (Inflow – Outflow)	2,390 **(+ 0.02% of total storage)**

1 - BLM, 2012
2 - BLM, 2012
3 - CEC, 2015
4 - WorleyParsons, 2009
5 - Based on CEC, 2015 plus extractions of Genesis Solar Electric Plant (WorleyParsons, 2009)
6 - CEC, 2010
7 - CEC, 2010

Table 5. Estimated Baseline Groundwater Budget for the Chuckwalla Valley Groundwater Basin Using NPS Estimates of Precipitation and Subsurface Inflow.

Budget Components	Acre-Feet per Year
Inflow	
Recharge from Precipitation[1]	2,060
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins[2]	953
Irrigation Return Flow[3]	800
Wastewater Return Flow[4]	831
Total Inflow	4,644
Outflow	
Groundwater Extraction[5]	–10,579
Underflow to Palo Verde Mesa Groundwater Basin[6]	–400
Evapotranspiration at Palen Dry Lake[7]	–350
Total Outflow	–11,329
Budget Balance (Inflow – Outflow)	–6,685 **(- 0.04% of total storage)**

1 - BLM, 2012
2 - BLM, 2012
3 - CEC, 2015
4 - WorleyParsons, 2009
5 - Based on CEC, 2015 plus extractions of Genesis Solar Electric Plant (WorleyParsons, 2009)
6 - CEC, 2010
7 - CEC, 2010

Dry Year

According to SB 610 guidelines, a dry year can be considered a year with a precipitation amount that is at 10 percent probability of occurrence, meaning 10 percent of the years would be drier. A critical dry year would be a year with 3 percent probability. The historic precipitation data at Blythe, California, approximately 35 miles east of the project and at a similar elevation with similar climate, was used as a reference. Historical precipitation data for Blythe, dating from 1893 to 2014, is available from the United States Historical Climatology Network (USHCN, 2016). The average of the annual precipitation from 1893 to 2014 at Blythe was 3.42 inches (Note that this is not the same as the WRCC (2016) estimate. However, this estimate is used only for calculating relative precipitation for dry years which is similar to the precipitation in the project area. The 10-percent probability dry year was estimated by ranking precipitation years from 1893 to 2014 from lowest to highest, and giving them ranking numbers 1 to 122 with the lowest precipitation year number 1 and the highest precipitation year number 122. Dividing the ranking number by the total (122) gives a relative probability of the precipitation in any given year being less than the corresponding precipitation for the ranking number. For instance, the precipitation for Year 2009 was 1.15 inches and ranked #13. Dividing 13 by 122 and converting to percent gives 10.7%. Consequently, 1.15 inches of rain, or about 34 percent of average annual precipitation at Blythe, was considered the 10 percent probability dry year. The critical dry year was estimated in the same way and found to be approximately 0.72 inches of precipitation, or 21 percent of average precipitation (reference precipitation year 2000, ranking #4 of 122 giving 3.3 percent relative probability).

This section provides a revised baseline groundwater budget based on dry year and critical dry year conditions. The following assumptions were used:

- Recharge from precipitation is the primary factor in determining the dry year groundwater budgets. Dry years are expected to produce less recharge from precipitation, due to the fact that less runoff would generally be expected to occur in dry years, resulting in less runoff leading to infiltration. This would depend, of course, on the pattern, intensity and distribution of precipitation in a dry year, which is difficult to predict for the future. There is some evidence (USGS, 2007) that lower precipitation years may in general give a lower percentage of precipitation ending up as recharge, but the evidence is apparently not consistent, and data presented by the USGS (USGS, 2007) provides no information below 3 percent, which is the percentage used as a basis for the infiltration rate used in this analysis. Therefore, for purposes of this analysis a simplifying assumption was made that the reduction in infiltration to groundwater is in direct proportion to the reduction in precipitation. A dry year recharge is therefore estimated as 8,588 afy multiplied by 0.34 (the ratio of dry year to average year precipitation). This calculation gives 2,920 afy precipitation recharge for a dry year, and 1,803 afy for a critical dry year.
- Underflow from the Pinto Valley and Orocopia Groundwater Basins is assumed to be unaffected. Some dry-year effect could occur, especially in the case of multiple dry years, but the timing of the effect would probably be delayed, and the magnitude of the effect much reduced due to the volume of existing groundwater already in these basins.

- Irrigation return flow is assumed to be unaffected. The area is naturally very arid, and it is assumed that natural precipitation, which in normal years is infrequent, is of minor or negligible consideration in the determination of the amount of irrigation water needed yearly.
- Wastewater return flow is assumed to be unaffected for similar reasons as for precipitation.
- Groundwater extraction is assumed to be unaffected by dry years for the same reasons the irrigation return flow and wastewater return flow were assumed to be unaffected.
- Underflow to Palo Verde Mesa Groundwater Basin was assumed to be unaffected for the same reasons the inflow from the Pinto Valley and Orocopia Groundwater Basins was assumed to be unaffected.
- Evapotranspiration at Palen Dry Lake was assumed to be unaffected for the reason that a single dry year, or critical dry year, would result in a reduction of a maximum of 6,782 acre feet of recharge. Given the size of the CVGB (940 square miles) a one-year reduction of this magnitude would only reduce the average groundwater level by about 0.14 inches. Evapotranspiration could be affected by a significant, long-term groundwater deficit, but for purposes of this analysis evapotranspiration was assumed to remain constant.

Tables 8 and 9 provide the assumed baseline groundwater budgets for a dry year and critical dry year. In both cases, a groundwater deficit is expected for the year, meaning groundwater withdrawals would exceed groundwater input. A dry year is expected to have a deficit of approximately 3,278 acre feet, increasing to 4,395 acre feet for a critical dry year.

Tables 8 and 9 provide the results of the same analysis using the NPS estimates of precipitation and underflow recharge. Each scenario, dry year and critical dry year, would have groundwater deficits, amounting to 8,045 afy and 8,312 afy, respectively.

Table 6. Estimated Dry Year Groundwater Budget for the Chuckwalla Valley Groundwater Basin

Budget Components	Acre-Feet per Year
Inflow	
Recharge from Precipitation	2,920
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins	3,500
Irrigation Return Flow	800
Wastewater Return Flow	831
Total Inflow	8,051
Outflow	
Groundwater Extraction	–10,579
Underflow to Palo Verde Mesa Groundwater Basin	–400
Evapotranspiration at Palen Dry Lake	–350
Total Outflow	–11,329
Budget Balance (Inflow – Outflow)	–3,278 **(- 0.02% of total storage)**

Table 7. Estimated Critical Dry Year Groundwater Budget for the Chuckwalla Valley Groundwater Basin

Budget Components	Acre-Feet per Year
Inflow	
Recharge from Precipitation	1,803
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins	3,500
Irrigation Return Flow	800
Wastewater Return Flow	831
Total Inflow	6,934
Outflow	
Groundwater Extraction	–10,579
Underflow to Palo Verde Mesa Groundwater Basin	–400
Evapotranspiration at Palen Dry Lake	–350
Total Outflow	–11,329
Budget Balance (Inflow – Outflow)	–4,395 **(-0.02% of total storage)**

Table 8. Estimated Dry Year Groundwater Budget for the Chuckwalla Valley Groundwater Basin Using NPS Estimates of Precipitation and Subsurface Inflow

Budget Components	Acre-Feet per Year
Inflow	
Recharge from Precipitation	700
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins	953
Irrigation Return Flow	800
Wastewater Return Flow	831
Total Inflow	3,284
Outflow	
Groundwater Extraction	-10,579
Underflow to Palo Verde Mesa Groundwater Basin	-400
Evapotranspiration at Palen Dry Lake	-350
Total Outflow	-11,329
Budget Balance (Inflow – Outflow)	–8,045 **(- 0.05% of total storage)**

Table 9. Estimated Critical Dry Year Groundwater Budget for the Chuckwalla Valley Groundwater Basin Using NPS Estimates of Precipitation and Subsurface Inflow

Budget Components	Acre-Feet per Year
Inflow	
Recharge from Precipitation	433
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins	953
Irrigation Return Flow	800
Wastewater Return Flow	831
Total Inflow	3,017
Outflow	
Groundwater Extraction	–10,579

Table 9. Estimated Critical Dry Year Groundwater Budget for the Chuckwalla Valley Groundwater Basin Using NPS Estimates of Precipitation and Subsurface Inflow

Budget Components	Acre-Feet per Year
Underflow to Palo Verde Mesa Groundwater Basin	–400
Evapotranspiration at Palen Dry Lake	–350
Total Outflow	–11,329
Budget Balance (Inflow – Outflow)	**–8,312 (- 0.06% of total storage)**

Multiple Dry Years

The Blythe precipitation data shows that in the 122 years of record from 1893 to 2014, the longest consecutive series of dry (10 percent) years on record is two. There are no consecutive critical dry years on record. A two-year string of dry years would result in a baseline groundwater deficit of twice the amount given in Table 6, or 6,556 acre feet. A three-year string of dry years would result in a baseline groundwater deficit of 9,834 acre feet (0.07% of total storage). The longest consecutive series of years with below average precipitation on record at Blythe was 12 years, from 1893 to 1904. This period was considered to be representative of a series of multiple dry years for the purposes of this analysis.

Table 10 presents the results of an estimated 12-year groundwater budget assuming a repeat of the 1893-1904 drought at Blythe, assuming without-project conditions. The results show that at the end of the 12-year period, the cumulative groundwater deficit would be approximately 31,612 acre feet (0.2% of total storage). Table 11 shows the same analysis using NPS estimates of precipitation and subsurface recharge. In that scenario, at the end of the 12-year period the cumulative groundwater deficit would be more than 94,682 acre feet (0.6% of total storage).

Table 10. Baseline Multiple Dry Year Groundwater Budget in Acre Feet Using Adopted Estimates of Precipitation and Subsurface Inflow.

Year	1	2	3	4	5	6
Dry Year Reference Year	1893	1894	1895	1896	1897	1898
Precipitation, in Inches	1.75	2.16	1.84	1.29	2.84	1.30
Precipitation as Percentage of Average	51%	63%	54%	38%	83%	38%
Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588
Dry Year Adjusted Recharge from Precipitation	4,394	5,424	4,620	3,239	7,132	3,264
Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	9,525	10,555	9,751	8,370	12,263	8,395
Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Budget Balance (Inflow - Outflow)	-1,804	-774	-1,578	-2,959	934	-2,934
Cumulative Budget Balance (Inflow - Outflow)	-1,804	-2,578	-4,155	-7,114	-6,180	-9,114
Year	**7**	**8**	**9**	**10**	**11**	**12**
Dry Year Reference Year	1899	1900	1901	1902	1903	1904
Precipitation, in Inches	0.75	0.56	1.21	1.12	0.88	1.33
Precipitation as Percentage of Average	22%	16%	35%	33%	26%	39%

Table 10. Baseline Multiple Dry Year Groundwater Budget in Acre Feet Using Adopted Estimates of Precipitation and Subsurface Inflow.

Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588
Dry Year Adjusted Recharge from Precipitation	1,883	1,406	3,038	2,812	2,210	3,340
Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	7,014	6,537	8,169	7,943	7,341	8,471
Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Budget Balance (Inflow - Outflow)	-4,315	-4,792	-3,160	-3,386	-3,988	-2,858
Cumulative Budget Balance (Inflow - Outflow)	-13,428	-18,220	-21,380	-24,765	-28,754	-31,612

Table 11. Baseline Multiple Dry Year Groundwater Budget in Acre Feet Using NPS Estimates of Precipitation and Subsurface Inflow.

Year	1	2	3	4	5	6
Dry Year Reference Year	1893	1894	1895	1896	1897	1898
Precipitation, in Inches	1.75	2.16	1.84	1.29	2.84	1.30
Precipitation as Percentage of Average	51%	63%	54%	38%	83%	38%
Normal Recharge from Precipitation	2,060	2,060	2,060	2,060	2,060	2,060
Dry Year Adjusted Recharge from Precipitation	1,054	1,301	1,108	777	1,711	783
Other Groundwater Recharge (All Sources)	2,584	2,584	2,584	2,584	2,584	2,584
Total Groundwater Recharge	3,638	3,885	3,692	3,361	4,295	3,367
Groundwater Outflow (All Sources)	–11,329	–11,329	–11,329	–11,329	–11,329	–11,329
Budget Balance (Inflow - Outflow)	–7,691	–7,444	–7,637	–7,968	–7,034	–7,962
Cumulative Budget Balance (Inflow - Outflow)	–7,691	–15,135	–22,772	–30,740	–37,774	–45,736
Year	**7**	**8**	**9**	**10**	**11**	**12**
Dry Year Reference Year	1899	1900	1901	1902	1903	1904
Precipitation, in Inches	0.75	0.56	1.21	1.12	0.88	1.33
Precipitation as Percentage of Average	22%	16%	35%	33%	26%	39%
Normal Recharge from Precipitation	2,060	2,060	2,060	2,060	2,060	2,060
Dry Year Adjusted Recharge from Precipitation	452	337	729	675	530	801
Other Groundwater Recharge (All Sources)	2,584	2,584	2,584	2,584	2,584	2,584
Total Groundwater Recharge	3,036	2,921	3,313	3,259	3,114	3,385
Groundwater Outflow (All Sources)	–11,329	–11,329	–11,329	–11,329	–11,329	–11,329
Budget Balance (Inflow - Outflow)	–8,293	–8,408	–8,016	–8,070	–8,215	–7,944
Cumulative Budget Balance (Inflow - Outflow)	–54,029	–62,437	–70,453	–78,523	–86,738	–94,682

5.2 Groundwater Budget with Palen Solar and Cumulative Projects

Normal (Average) Year

Regardless of the water supply scenario as described in Section 2, all water for the project would be derived from the CVGB. Total water use by the Palen Solar Project will be up to 700 afy for the first 30 months of construction, and up to 41 afy for all subsequent years of operation. Based on the budget balance given in Table 4, the CVGB overall would have capacity to provide sufficient water for a 30-year period under average-year conditions, within the estimated annual recharge surplus, without inducing a groundwater deficit. Table 12 provides a summary of the projected groundwater budget with the project in place. For average precipitation years, the Palen Solar Project alone would use less water in 30 years than the total average year surplus for the CVGB, resulting in no loss of groundwater storage over the same time period. The CVGB would have 68,823 af more groundwater at the end of the 30-year period than at the beginning. This is compared to the baseline 30-year surplus of 71,700 af. The Palen Solar Project would reduce this without-project surplus by about 4 percent. By contrast, using the NPS recharge rates for precipitation and underflow, the with-project deficit at the end of 30 years would be 203,428 af (Table 13). This is compared to the baseline 30-year deficit of 200,550 af. The Palen Solar Project would contribute about one percent to this cumulative deficit.

Table 12. CVGB Groundwater 30-Year Budget in Acre Feet for Average Precipitation Year with Palen Solar Project in Place Using Adopted Estimates of Precipitation and Subsurface Inflow.

Year	1	2	3	4	5	6	7	8	9	10
Palen Solar Project (afy)	700	700	371	41	41	41	41	41	41	41
Total Cumulative Use by Palen Solar Project (afy)	700	1,400	1,771	1,812	1,853	1,894	1,935	1,976	2,017	2,058
CVGB Baseline Average Year Surplus (afy)	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390
CVGB Surplus Minus Palen Solar Project (afy)	1,690	1,690	2,020	2,349	2,349	2,349	2,349	2,349	2,349	2,349
Cumulative CVGB Surplus (af)	1,690	3,380	5,400	7,749	10,098	12,447	14,796	17,145	19,494	21,843
Year	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Palen Solar Project (afy)	41	41	41	41	41	41	41	41	41	41
Total Cumulative Use by Palen Solar Project (afy)	2,099	2,140	2,181	2,222	2,263	2,304	2,345	2,386	2,427	2,468
CVGB Baseline Average Year Surplus (afy)	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390
CVGB Surplus Minus Palen Solar Project (afy)	2,349	2,349	2,349	2,349	2,349	2,349	2,349	2,349	2,349	2,349
Cumulative CVGB Surplus (af)	24,192	26,541	28,890	31,239	33,588	35,937	38,286	40,635	42,984	45,333
Year	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Palen Solar Project (afy)	41	41	41	41	41	41	41	41	41	41

Table 12. CVGB Groundwater 30-Year Budget in Acre Feet for Average Precipitation Year with Palen Solar Project in Place Using Adopted Estimates of Precipitation and Subsurface Inflow.

Total Cumulative Use by Palen Solar Project (afy)	2,509	2,550	2,591	2,632	2,673	2,714	2,755	2,796	2,837	2,878
CVGB Baseline Average Year Surplus (afy)	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390
CVGB Surplus Minus Palen Solar Project (afy)	2,349	2,349	2,349	2,349	2,349	2,349	2,349	2,349	2,349	2,349
Cumulative CVGB Surplus (af)	47,682	50,031	52,380	54,729	57,078	59,427	61,776	64,125	66,474	68,823

Table 13. CVGB Groundwater 30-Year Budget for Average Precipitation Year with Palen Solar Project in Place Using NPS Infiltration and Underflow Recharge Estimates

Year	1	2	3	4	5	6	7	8	9	10
Palen Solar Project (afy)	700	700	371	41	41	41	41	41	41	41
Total Cumulative Use by Palen Solar Project (afy)	700	1,400	1,771	1,812	1,853	1,894	1,935	1,976	2,017	2,058
CVGB Baseline Average Year Deficit (afy)	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685
CVGB Surplus Minus Palen Solar Project (afy)	-7,385	-7,385	-7,056	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726
Cumulative CVGB Surplus (af)	-7,385	–14,770	-21,826	-28,552	-35,278	–42,004	–48,730	–55,456	–62,182	–68,908
Year	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Palen Solar Project (afy)	41	41	41	41	41	41	41	41	41	41
Total Cumulative Use by Palen Solar Project (afy)	2,099	2,140	2,181	2,222	2,263	2,304	2,345	2,386	2,427	2,468
CVGB Baseline Average Year Surplus (afy)	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685
CVGB Surplus Minus Palen Solar Project (afy)	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726
Cumulative CVGB Surplus (af)	–75,634	–82,360	–89,086	–95,812	–102,538	–109,264	–115,990	–122,716	–129,442	–136,168
Year	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Palen Solar Project (afy)	41	41	41	41	41	41	41	41	41	41
Total Cumulative Use by Palen Solar Project (afy)	2,509	2,550	2,591	2,632	2,673	2,714	2,755	2,796	2,837	2,878
CVGB Baseline Average Year Surplus (afy)	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685
CVGB Surplus Minus Palen Solar Project (afy)	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726	–6,726
Cumulative CVGB Surplus (af)	–142,894	–149,620	–156,346	–163,072	–169,798	–176,524	–183,250	–189,976	–196,702	–203,428

For a single dry year and single critical dry year with the Palen Solar Project in place, the worst-case scenario is for one of those years, dry or critical dry, to occur during the first year of construction. During the first year of construction the CVGB annual groundwater deficit if a dry

year or critical dry year occurs would be 3,978 and 5,095 af, respectively. By comparison to Tables 6 and 7, the Palen Solar Project would increase the dry year deficit by 16 to 21 percent if a dry year or critical dry year occurs during the first year of construction. Assuming normal precipitation returns, this deficit would be completely recovered in the fourth year under both (dry or critical dry) scenarios. Using this same assumption for the rest of the 30-year lifespan, the cumulative groundwater surplus would be 66,032 af without the project and 62,454 af (5% reduction of surplus) if a dry year occurs during the first year of construction of the project. If a critical dry year occurs during the first year of the project the end-of-30-year without-project surplus would be 62,454 af and 61,338 af with-project (2% reduction of surplus).

Using NPS precipitation data, the single-year deficits depicted in Tables 8 and 9 are 8,053 afy for dry and 8,312 afy for critical dry years without the project. These deficits would increase to 8,753 and 9,012 afy for dry and critical dry years during the first year of construction (8% and 9% deficit increases, respectively), resulting in an increase of the overall single-year deficit from 0.05% of the total CVGB to 0.06%. Assuming normal precipitation returns after the dry year, this deficit would not be recovered during the project lifespan, with or without the project. Using the assumption of a single dry year at the beginning of the 30-year lifespan and normal precipitation afterward, the cumulative groundwater deficit would be 201,918 without the project and 204,796 af if a dry year occurs during the first year of construction (a 1.43% deficit increase) with the Palen Solar Project in place. This would result in an increase of the overall deficit from 1.35% of the total CVGB to 1.37%. The deficit would be 202,177 af in a critical dry year occurring in the first year of the 30-year period without the project and 205,055 af if a critical dry year occurs during the first year of construction (a 1.42% deficit increase). This would result in an increase of the overall deficit from 1.35% of the total CVGB to 1.37%. This is compared to a 200,550 af deficit after the same period assuming normal precipitation every year without the Palen Solar project, and an 203,428 afy deficit with the project (a 1.43% deficit increase). This would result in an increase in the overall deficit from 1.34% of the total CVGB to 1.36%.

Cumulative projects that are projected or already constructed are listed in Table 14, with their projected water use. Water used for agriculture is not anticipated to increase so was not included in the cumulative projects. Peak agriculture in the Desert Center region occurred in 1994 with an estimated 6,100 acres under cultivation. Since then, agriculture has continued to decline with an estimated 2,100 acres under cultivation in 2016.

Table 14. Cumulative Projects – Water Use Summary

Project Name	Construction Start (year)	Construction Duration (years)	Annual Construction Water Use (afy)	Annual Operational Water Use (afy)
Palen Solar Project	2018[1]	2.5	700	41
First Solar Desert Sunlight Solar Farm	Completed	2.2	600–650	0.3
Red Bluff Substation	Completed	2.2	150	0
Gen-tie line	Completed	1	6.25	0
Devers-Palo Verde 2 Transmission Line Project	Completed	3	4	0
Colorado River Substation Expansion	Completed	2	66–215	0
Blythe Energy Project Transmission Line	Completed	2	4	0
Desert Southwest Transmission Line	2018[1]	2	0.6	0
Eagle Crest Pumped Storage Project	2019[2]	4	4,456[4]	2,050[4]

Table 14. Cumulative Projects – Water Use Summary

Project Name	Construction Start (year)	Construction Duration (years)	Annual Construction Water Use (afy)	Annual Operational Water Use (afy)
Genesis Solar Energy Project	Completed	3	616–1,368	218[5]
Blythe Energy Transmission Line	Completed	-	2	0
Desert SW Transmission	2018[1]	-	0.3	0
Desert Harvest Solar PV Project	2017[3]	2	400-500	26-39
DC 50 Solar Project (450 acres) (50 MW)[6]	2019[9]	1	100	2.5
SunEdison Origination3, LLC (1,800 acres) (250 MW – calculated)[6]	2019[9]	2	275[7]	12.5
First Solar Development, LLC (3,500 acres) (500 MW – calculated)[6]	2019[9]	2.5	440[8]	25
SunPower Project (2,000 acres) (up to 400 MW ac)[6]	2019[9]	2 (between 2019 and 2021)	440	20

1 - Actual projected start November 2017. January 1, 2018 is used for this analysis.
2 - CEC, 2015
3 - EA, 2016
4 - BLM Estimate (FERC, 2014). Of this amount, 600 cfs is expected to seep back into the groundwater (ECEC, 2008), then pumped back out and reused..
5 - BIM (2010). Genesis is a completed project. - This amount is included in the baseline analysis.
6 - The information provided to the BLM does not include the level of detail required for these four projects. Where necessary, MW have been calculated for the projects using the DRECP assumption of 7 acres per megawatt. Additionally, assumptions were made regarding water use for construction and operations, as well as the construction duration. The water use assumptions were taken from Sandia (2013). - For California, this report calculated 2.2 acre-feet per megawatt for construction and 0.05 acre-feet per megawatt per year for operations.
7 - Using the assumptions stated above, a 250 MW project would require an estimated 550 af total for construction, assuming a 2-year construction timeframe, this would require 275 afy.
8 - Using the assumptions stated above, a 500 MW project would require an estimated 1,000 af total for construction. Assuming a 2.5-year construction timeframe, this would require 440 afy.
9 - The project has not provided a construction start date and 2019 is a conservative assumption of when this could occur as it provides time for the NEPA review but conservatively assumes some construction overlap with the Palen Solar Project.

Table 14 shows that the Eagle Crest Pumped Storage Project would use about 15 times more operational groundwater than all other future projects combined. The Palen Solar Project contributes about two percent of the total operational extractions, long-term. At the time of this report, the Eagle Crest Pumped Storage Project has not been approved. It is still under consideration, and was therefore included in the analysis below.

Table 15 provides a 30-year groundwater budget projection for average years with Palen Solar Project and all cumulative projects in place. Only those cumulative projects that would have an effect on groundwater during the assumed 2018 to 2046 period of analysis are included. Assuming an average precipitation year, there would be an initial groundwater overdraft of up to 11,106 af in the year 2022. The groundwater basin would then begin to recover. By the end of the 30-year period, the cumulative groundwater deficit would be approximately 6,114 acre feet, approximately 0.04% of total storage. Without the Palen Solar project, and all other cumulative projects in place, there would be a deficit of 3,236 acre feet at the end of the 30-year period. Without the Eagle Crest project, but assuming the Palen Solar project and all other cumulative projects are in place, the CVGB would have a growing surplus of groundwater for all 30 analysis years.

Table 16 represents the same analysis using NPS infiltration and underflow estimates, and shows a total cumulative deficit of about 278,364 af (2% of total storage), of which the Palen Solar project

would contribute about 1 percent, or 2,878 af. Using these inflow estimates, the CVGB would not recover the overdraft within 30-years period, with or without the project.

Table 15. 30-Year Projected CVGB Groundwater Budget in Acre Feet for Palen Solar Project Plus Cumulative Projects Using Adopted Precipitation and Underflow Recharge Estimates

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Palen Solar Project	700	700	371	41	41	41	41	41	41	41
First Solar Desert Sunlight Solar Farm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Desert Southwest Transmission Line	0.6	0.6	0	0	0	0	0	0	0	0
Eagle Crest Pumped Storage Project	0	4,456	4,456	4,456	4,456	2,050	2,050	2,050	2,050	2,050
Desert Harvest Solar PV Project	500	39	39	39	39	39	39	39	39	39
DC 50 Solar Project	0	100	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
SunEdison Origination 3	0	275	275	12.5	12.5	12.5	12.5	12.5	12.5	12.5
First Solar Development	0	440	440	233	25	25	25	25	25	25
SunPower Project	0	440	440	20	20	20	20	20	20	20
Total Used	1,201	6,451	6,024	4,784	4,596	2,190	2,190	2,190	2,190	2,190
CVGB Baseline Surplus	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390
CVGB Surplus Minus Total Use	1,189	-4,061	-3,634	-2,394	-2,206	200	200	200	200	200
Cumulative CVGB Surplus/Deficit	1,189	-2,872	-6,506	-8,900	-11,106	-10,907	-10,707	-10,507	-10,307	-10,108
Year	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**
Palen Solar Project	41	41	41	41	41	41	41	41	41	41
First Solar Desert Sunlight Solar Farm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Desert Southwest Transmission Line	0	0	0	0	0	0	0	0	0	0
Eagle Crest Pumped Storage Project	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050
Desert Harvest Solar PV Project	39	39	39	39	39	39	39	39	39	39
DC 50 Solar Project	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
SunEdison Origination 3	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
First Solar Development	25	25	25	25	25	25	25	25	25	25
SunPower Project	20	20	20	20	20	20	20	20	20	20
Total Used	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190

Table 15. 30-Year Projected CVGB Groundwater Budget in Acre Feet for Palen Solar Project Plus Cumulative Projects Using Adopted Precipitation and Underflow Recharge Estimates

CVGB Baseline Surplus	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390
CVGB Surplus Minus Total Use	200	200	200	200	200	200	200	200	200	200
Cumulative CVGB Surplus/Deficit	-9,908	-9,708	-9,509	-9,309	-9,109	-8,909	-8,710	-8,510	-8,310	-8,111
Year	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**
Palen Solar Project	41	41	41	41	41	41	41	41	41	41
First Solar Desert Sunlight Solar Farm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Desert Southwest Transmission Line	0	0	0	0	0	0	0	0	0	0
Eagle Crest Pumped Storage Project	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050
Desert Harvest Solar PV Project	39	39	39	39	39	39	39	39	39	39
DC 50 Solar Project	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
SunEdison Origination 3	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
First Solar Development	25	25	25	25	25	25	25	25	25	25
SunPower Project	20	20	20	20	20	20	20	20	20	20
Total Used	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190
CVGB Baseline Surplus	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390	2,390
CVGB Surplus Minus total use	200	200	200	200	200	200	200	200	200	200
Cumulative CVGB Surplus/Deficit	-7,911	-7,711	-7,512	-7,312	-7,112	-6,912	-6,713	-6,513	-6,313	-6,114

Table 16. 30-Year Projected CVGB Groundwater Budget in Acre Feet for Palen Solar Project Plus Cumulative Projects Using NPS Precipitation and Underflow Recharge Estimates.

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Palen Solar Project	700	700	371	41	41	41	41	41	41	41
First Solar Desert Sunlight Solar Farm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Desert Southwest Transmission Line	0.6	0.6	0	0	0	0	0	0	0	0
Eagle Crest Pumped Storage Project	0	4,456	4,456	4,456	4,456	2,050	2,050	2,050	2,050	2,050
Desert Harvest Solar PV Project	500	39	39	39	39	39	39	39	39	39
DC 50 Solar Project		100	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Table 16. 30-Year Projected CVGB Groundwater Budget in Acre Feet for Palen Solar Project Plus Cumulative Projects Using NPS Precipitation and Underflow Recharge Estimates.

SunEdison Origination 3		275	275	12.5	12.5	12.5	12.5	12.5	12.5	12.5
First Solar Development		440	440	233	25	25	25	25	25	25
SunPower Project		440	440		20	20	20	20	20	20
Total Used	1,201	6,451	6,024	4,784	4,596	2,190	2,190	2,190	2,190	2,190
CVGB Baseline Deficit	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685
CVGB Surplus Minus Total Use	–7,886	–13,136	–12,709	–11,469	–11,281	-8,875	-8,875	-8,875	-8,875	-8,875
Cumulative CVGB Surplus/Deficit	–7,886	–21,022	–33,731	–45,200	–56,481	-65,357	-74,232	-83,107	-91,982	-100,858
Year	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**
Palen Solar Project	41	41	41	41	41	41	41	41	41	41
First Solar Desert Sunlight Solar Farm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Desert Southwest Transmission Line	0	0	0	0	0	0	0	0	0	0
Eagle Crest Pumped Storage Project	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050
Desert Harvest Solar PV Project	39	39	39	39	39	39	39	39	39	39
DC 50 Solar Project	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
SunEdison Origination 3	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
First Solar Development	25	25	25	25	25	25	25	25	25	25
SunPower Project	20	20	20	20	20	20	20	20	20	20
Total Used	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190
CVGB Baseline Deficit	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685
CVGB Deficit Minus total use	-8,875	-8,875	-8,875	-8,875	-8,875	-8,875	-8,875	-8,875	-8,875	-8,875
Cumulative CVGB Surplus/Deficit	-109,733	-118,608	-127,484	-136,359	-145,234	-154,110	-162,985	-171,860	-180,735	-189,611
Year	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**
Palen Solar Project	41	41	41	41	41	41	41	41	41	41
First Solar Desert Sunlight Solar Farm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Desert Southwest Transmission Line	0	0	0	0	0	0	0	0	0	0
Eagle Crest Pumped Storage Project	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050	2,050
Desert Harvest Solar PV Project	39	39	39	39	39	39	39	39	39	39
DC 50 Solar Project	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Table 16. 30-Year Projected CVGB Groundwater Budget in Acre Feet for Palen Solar Project Plus Cumulative Projects Using NPS Precipitation and Underflow Recharge Estimates.

SunEdison Origination 3	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
First Solar Development	25	25	25	25	25	25	25	25	25	25
SunPower Project	20	20	20	20	20	20	20	20	20	20
Total Used	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190	2,190
CVGB Baseline Deficit	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685	–6,685
CVGB Deficit Minus Total use	-8,875	-8,875	-8,875	-8,875	-8,875	-8,875	-8,875	-8,875	-8,875	-8,875
Cumulative CVGB Surplus/Deficit	-198,486	-207,361	-216,237	-225,112	-233,987	-242,863	-251,738	-260,613	-269,488	-278,364

Dry Year

From the analysis in Table 15, the year with the highest groundwater deficit would be 2022. For that year, assuming dry year and critical dry year precipitation, the CVGB cumulative groundwater deficit would be 16,774 af (0.11% of total storage) and 17,891 af (0.12% of total storage) respectively, if all cumulative projects are in place and assuming adopted recharge inputs and four previous years of normal precipitation. Using NPS recharge estimates, the deficits would be 21,541 af and 21,808 af, respectively.

Multiple Dry Years

Table 17 provides a summary of the multiple dry year analysis using the same methods as described for Table 15, and assuming the Palen Solar Project plus all cumulative projects are in place. At the end of the 12-year period, the cumulative groundwater deficit would be approximately 70,000 acre feet (0.6% of total storage). Palen Solar Project would contribute 2,140 af to this deficit, or about three percent of the deficit. Table 18 provides the same analysis using the NPS estimates of recharge, showing a cumulative deficit of 133,070 af (0.9% of total storage). Palen Solar Project would cause about 1.6 percent of this deficit.

Table 17. Multiple Dry Year Groundwater Budget in Acre Feet with Palen Solar Project and All Cumulative Projects in Place

Year	1	2	3	4	5	6
Dry Precipitation Reference Year	1893	1894	1895	1896	1897	1898
Dry Year Adjusted Recharge from Precipitation (afy) (From Table 10)	4,394	5,424	4,620	3,239	7,132	3,264
Non-Precipitation Groundwater Recharge, All Sources (afy) (From Table 4)	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge (afy)	9,525	10,555	9,751	8,370	12,263	8,395
Non-Project Groundwater Loss, All Sources (afy) (From Table 4)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329

Table 17. Multiple Dry Year Groundwater Budget in Acre Feet with Palen Solar Project and All Cumulative Projects in Place

Project Groundwater Extraction, All Projects) (afy) (From Table 15)	-1,201	-6,451	-6,024	-4,784	-4,596	-2,190
Total Groundwater Loss (afy)	-12,530	-17,780	-17,353	-16,113	-15,925	-13,519
Budget Balance (Recharge – Losses) (afy)	-3,004	-7,225	-7,601	-7,743	-3,663	-5,124
Cumulative Budget Balance (Recharge – Losses) (afy)	-3,004	-10,229	-17,831	-25,574	-29,236	-34,360
Year	**7**	**8**	**9**	**10**	**11**	**12**
Dry Precipitation Reference Year	1899	1900	1901	1902	1903	1904
Dry Year Adjusted Recharge from Precipitation (afy) (From Table 10)	1,883	1,406	3,038	2,812	2,210	3,340
Non-Precipitation Groundwater Recharge, All Sources (afy) (From Table 4)	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge (afy)	7,014	6,537	8,169	7,943	7,341	8,471
Non-Project Groundwater Loss, All Sources (afy) (From Table 4)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Project Groundwater Extraction, All Projects) (afy) (From Table 15)	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190
Total Groundwater Loss (afy)	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519
Budget Balance (Recharge – Losses) (afy)	-6,505	-6,982	-5,350	-5,576	-6,179	-5,049
Cumulative Budget Balance (Recharge – Losses) (afy)	-40,865	-47,847	-53,197	-58,773	-64,952	-70,000

Table 18. Multiple Dry Year Groundwater Budget in Acre Feet with Palen Solar Project and All Cumulative Projects in Place Using NPS Estimates of Precipitation and Underflow Recharge

Year	1	2	3	4	5	6
Dry Precipitation Reference Year	1893	1894	1895	1896	1897	1898
Dry Year Adjusted Recharge from Precipitation (afy) (From Table 11)	1,054	1,301	1,108	777	1,711	783
Non-Precipitation Groundwater Recharge, All Sources (afy) (From Table Z4)	2,584	2,584	2,584	2,584	2,584	2,584
Total Groundwater Recharge (afy)	3,638	3,885	3,692	3,361	4,295	3,367
Non-Project Groundwater Loss, All Sources (afy) (From Table 5)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Project Groundwater Extraction, All Projects) (afy) (From Table 15)	-1,201	-6,451	-6,024	-4,784	-4,596	-2,190
Total Groundwater Loss (afy)	-12,530	-17,780	-17,353	-16,113	-15,925	-13,519
Budget Balance (Recharge - Losses) (afy)	-8,892	-13,895	-13,660	-12,752	-11,631	-10,152
Cumulative Budget Balance (Recharge - Losses) (afy)	-8,892	-22,787	-36,447	-49,199	-60,830	-70,982
Year	**7**	**8**	**9**	**10**	**11**	**12**
Dry Precipitation Reference Year	1899	1900	1901	1902	1903	1904
Dry Year Adjusted Recharge from Precipitation (afy) (From Table 11)	452	337	729	675	530	801

Table 18. Multiple Dry Year Groundwater Budget in Acre Feet with Palen Solar Project and All Cumulative Projects in Place Using NPS Estimates of Precipitation and Underflow Recharge

Non-Precipitation Groundwater Recharge, All Sources (afy) (From Table Z5)	2,584	2,584	2,584	2,584	2,584	2,584
Total Groundwater Recharge (afy)	3,036	2,921	3,313	3,259	3,114	3,385
Non-Project Groundwater Loss, All Sources (afy) (From Table 4)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Project Groundwater Extraction, All Projects (afy) (From Table 15)	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190
Total Groundwater Loss (afy)	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519
Budget Balance (Recharge – Losses) (afy)	-10,484	-10,598	-10,206	-10,261	-10,405	-10,134
Cumulative Budget Balance (Recharge – Losses) (afy)	-81,466	-92,064	-102,270	-112,531	-122,936	-133,070

The rainfall record shows that a series of dry years has been followed by a series of years with above-average rainfall. To assess the probable effect of this over the 30-year life of the project, a 30-year running average analysis was made of the 121 years of record. This analysis, including the 30-year multiple-dry-year baseline calculation, is summarized in Tables 19 to 21.

It was found that the driest 30-year period was the period beginning in 1893 and ending in 1922. Average annual rainfall during this period was 3.05 inches, or about 89% of normal. Table 19 shows that if a repeat of this 30-year period occurs under current (no project) conditions, at the end of the 30-year period the CVGB would have a surplus of 43,601 af assuming adopted rainfall and infiltration conditions. The worst year of the drought-induced deficit in the CVGB would be year 12, in which the total deficit would be 31,612 af. Recovery would then begin with total recovery by year 21, and there would be a groundwater surplus of 43,601 af by the end of the 30 years. Using NPS recharge data, the same analysis results in a continually-increasing groundwater deficit ending at 207,290 af after 30 years.

Table 20 provides the same analysis with the Palen Solar project in place but no other cumulative project. The results are similar to the without-project condition, with total groundwater recovery occurring in year 22, and recovery to a surplus of 40,723 af at the end of 30 years. Using NPS recharge data, the same analysis, with the Palen Solar project in place, results in a continually-increasing groundwater deficit ending at 210,168 af after 30 years.

Table 21 provides the cumulative-project analysis. With all cumulative projects in place, the greatest CVGB deficit would occur in year 12, after which recovery would begin, but full recovery would not occur during the 30-year period. The CVGB would end the period with a 34,213-af deficit. Using NPS recharge data, the 30-year deficit would be 285,104 af.

Table 19. 30-Year Projected CVGB Groundwater Budget in Acre Feet for Baseline (No Project) Conditions Using Adopted Precipitation and Underflow Recharge Estimates and Assuming a Repeat of the Driest 30 Years on Record at Blythe.

Year	1	2	3	4	5	6	7	8	9	10
Precipitation Reference Year	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902
Rainfall, in Inches	1.75	2.16	1.84	1.29	2.84	1.3	0.75	0.56	1.21	1.12

Table 19. 30-Year Projected CVGB Groundwater Budget in Acre Feet for Baseline (No Project) Conditions Using Adopted Precipitation and Underflow Recharge Estimates and Assuming a Repeat of the Driest 30 Years on Record at Blythe.

Precipitation as Percentage of Average	51%	63%	54%	38%	83%	38%	22%	16%	35%	33%
Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588
Adjusted Recharge from Precipitation	4,394	5,424	4,620	3,239	7,132	3,264	1,883	1,406	3,038	2,812
Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	9,525	10,555	9,751	8,370	12,263	8,395	7,014	6,537	8,169	7,943
Non-Project Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Total Groundwater Outflow	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Budget Balance (Inflow - Outflow)	-1,804	-774	-1,578	-2,959	934	-2,934	-4,315	-4,792	-3,160	-3,386
Cumulative Budget Balance (Inflow - Outflow)	-1,804	-2,578	-4,155	-7,114	-6,180	-9,114	-13,428	-18,220	-21,380	-24,765
Year	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Precipitation Reference Year	**1903**	**1904**	**1905**	**1906**	**1907**	**1908**	**1909**	**1910**	**1911**	**1912**
Rainfall, in Inches	0.88	1.33	4.29	2.55	2.18	3.21	5.51	4.66	3.58	4.44
Precipitation as Percentage of Average	26%	39%	125%	75%	64%	94%	161%	136%	105%	130%
Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588
Adjusted Recharge from Precipitation	2,210	3,340	10,773	6,403	5,474	8,061	13,836	11,702	8,990	11,149
Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	7,341	8,471	15,904	11,534	10,605	13,192	18,967	16,833	14,121	16,280
Non-Project Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Total Groundwater Outflow	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329

Table 19. 30-Year Projected CVGB Groundwater Budget in Acre Feet for Baseline (No Project) Conditions Using Adopted Precipitation and Underflow Recharge Estimates and Assuming a Repeat of the Driest 30 Years on Record at Blythe.

Budget Balance (Inflow - Outflow)	-3,988	-2,858	4,575	205	-724	1,863	7,638	5,504	2,792	4,951
Cumulative Budget Balance (Inflow - Outflow)	-28,754	-31,612	-27,037	-26,832	-27,556	-25,693	-18,055	-12,551	-9,759	-4,808

Year	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Precipitation Reference Year	**1913**	**1914**	**1915**	**1916**	**1917**	**1918**	**1919**	**1920**	**1921**	**1922**
Rainfall, in Inches	4.8	5.82	3.88	3.64	1.82	6.64	3.66	4.51	7.08	2.11
Precipitation as Percentage of Average	140%	170%	113%	106%	53%	194%	107%	132%	207%	62%
Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588
Adjusted Recharge from Precipitation	12,053	14,615	9,743	9,140	4,570	16,674	9,191	11,325	17,779	5,298
Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	17,184	19,746	14,874	14,271	9,701	21,805	14,322	16,456	22,910	10,429
Non-Project Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Total Groundwater Outflow	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Budget Balance (Inflow - Outflow)	5,855	8,417	3,545	2,942	-1,628	10,476	2,993	5,127	11,581	-900
Cumulative Budget Balance (Inflow - Outflow)	1,048	9,464	13,009	15,952	14,324	24,800	27,792	32,920	44,500	43,601

Table 20. 30-Year Projected CVGB Groundwater Budget in Acre Feet Using Adopted Precipitation and Underflow Recharge Estimates and Assuming a Repeat of the Driest 30 Years on Record at Blythe, with the Palen Solar Project in Place.

Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Precipitation Reference Year	**1893**	**1894**	**1895**	**1896**	**1897**	**1898**	**1899**	**1900**	**1901**	**1902**
Rainfall, in Inches	1.75	2.16	1.84	1.29	2.84	1.3	0.75	0.56	1.21	1.12
Precipitation as Percentage of Average	51%	63%	54%	38%	83%	38%	22%	16%	35%	33%

Table 20. 30-Year Projected CVGB Groundwater Budget in Acre Feet Using Adopted Precipitation and Underflow Recharge Estimates and Assuming a Repeat of the Driest 30 Years on Record at Blythe, with the Palen Solar Project in Place.

Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588
Adjusted Recharge from Precipitation	4,394	5,424	4,620	3,239	7,132	3,264	1,883	1,406	3,038	2,812
Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	9,525	10,555	9,751	8,370	12,263	8,395	7,014	6,537	8,169	7,943
Non-Project Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Project Groundwater Outflow (Palen Solar Project only)	-700	-700	-371	-41	-41	-41	-41	-41	-41	-41
Total Groundwater Outflow	-12,029	-12,029	-11,700	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370
Budget Balance (Inflow - Outflow)	-2,504	-1,474	-1,949	-3,000	893	-2,975	-4,356	-4,833	-3,201	-3,427
Cumulative Budget Balance (Inflow - Outflow)	-2,504	-3,978	-5,926	-8,926	-8,033	-11,008	-15,363	-20,196	-23,397	-26,823
Year	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Precipitation Reference Year	**1903**	**1904**	**1905**	**1906**	**1907**	**1908**	**1909**	**1910**	**1911**	**1912**
Rainfall, in Inches	0.88	1.33	4.29	2.55	2.18	3.21	5.51	4.66	3.58	4.44
Precipitation as Percentage of Average	26%	39%	125%	75%	64%	94%	161%	136%	105%	130%
Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588
Adjusted Recharge from Precipitation	2,210	3,340	10,773	6,403	5,474	8,061	13,836	11,702	8,990	11,149
Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	7,341	8,471	15,904	11,534	10,605	13,192	18,967	16,833	14,121	16,280
Non-Project Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329

Table 20. 30-Year Projected CVGB Groundwater Budget in Acre Feet Using Adopted Precipitation and Underflow Recharge Estimates and Assuming a Repeat of the Driest 30 Years on Record at Blythe, with the Palen Solar Project in Place.

Project Groundwater Outflow (Palen Solar Project only)	-41	-41	-41	-41	-41	-41	-41	-41	-41	-41
Total Groundwater Outflow	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370
Budget Balance (Inflow - Outflow)	-4,029	-2,899	4,534	164	-765	1,822	7,597	5,463	2,751	4,910
Cumulative Budget Balance (Inflow - Outflow)	-30,853	-33,752	-29,218	-29,054	-29,819	-27,997	-20,400	-14,937	-12,186	-7,276
Year	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Precipitation Reference Year	**1913**	**1914**	**1915**	**1916**	**1917**	**1918**	**1919**	**1920**	**1921**	**1922**
Rainfall, in Inches	4.8	5.82	3.88	3.64	1.82	6.64	3.66	4.51	7.08	2.11
Precipitation as Percentage of Average	140%	170%	113%	106%	53%	194%	107%	132%	207%	62%
Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588
Adjusted Recharge from Precipitation	12,053	14,615	9,743	9,140	4,570	16,674	9,191	11,325	17,779	5,298
Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	17,184	19,746	14,874	14,271	9,701	21,805	14,322	16,456	22,910	10,429
Non-Project Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Project Groundwater Outflow (Palen Solar Project only)	-41	-41	-41	-41	-41	-41	-41	-41	-41	-41
Total Groundwater Outflow	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370	-11,370
Budget Balance (Inflow - Outflow)	5,814	8,376	3,504	2,901	-1,669	10,435	2,952	5,086	11,540	-941
Cumulative Budget Balance (Inflow - Outflow)	-1,461	6,914	10,418	13,320	11,651	22,086	25,037	30,124	41,663	40,723

Table 21. 30-Year Projected CVGB Groundwater Budget in Acre Feet Using Adopted Precipitation and Underflow Recharge Estimates and Assuming a Repeat of the Driest 30 Years on Record at Blythe, with all Cumulative Projects in Place.

Year	1	2	3	4	5	6	7	8	9	10
Precipitation Reference Year	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902
Rainfall, in Inches	1.75	2.16	1.84	1.29	2.84	1.3	0.75	0.56	1.21	1.12
Precipitation as Percentage of Average	51%	63%	54%	38%	83%	38%	22%	16%	35%	33%
Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588
Adjusted Recharge from Precipitation	4,394	5,424	4,620	3,239	7,132	3,264	1,883	1,406	3,038	2,812
Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	9,525	10,555	9,751	8,370	12,263	8,395	7,014	6,537	8,169	7,943
Non-Project Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Project Groundwater Outflow (All Cumulative Projects)	-1,201	-6,451	-6,024	-4,784	-4,596	-2,190	-2,190	-2,190	-2,190	-2,190
Total Groundwater Outflow	-12,530	-17,780	-17,353	-16,113	-15,925	-13,519	-13,519	-13,519	-13,519	-13,519
Budget Balance (Inflow - Outflow)	-3,004	-7,225	-7,601	-7,743	-3,663	-5,124	-6,505	-6,982	-5,350	-5,576
Cumulative Budget Balance (Inflow - Outflow)	-3,004	-10,229	-17,831	-25,574	-29,236	-34,360	-40,865	-47,847	-53,197	-58,773
Year	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Precipitation Reference Year	**1903**	**1904**	**1905**	**1906**	**1907**	**1908**	**1909**	**1910**	**1911**	**1912**
Rainfall, in Inches	0.88	1.33	4.29	2.55	2.18	3.21	5.51	4.66	3.58	4.44
Precipitation as Percentage of Average	26%	39%	125%	75%	64%	94%	161%	136%	105%	130%
Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588
Adjusted Recharge from Precipitation	2,210	3,340	10,773	6,403	5,474	8,061	13,836	11,702	8,990	11,149

Table 21. 30-Year Projected CVGB Groundwater Budget in Acre Feet Using Adopted Precipitation and Underflow Recharge Estimates and Assuming a Repeat of the Driest 30 Years on Record at Blythe, with all Cumulative Projects in Place.

Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	7,341	8,471	15,904	11,534	10,605	13,192	18,967	16,833	14,121	16,280
Non-Project Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Project Groundwater Outflow (All Cumulative Projects)	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190
Total Groundwater Outflow	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519
Budget Balance (Inflow - Outflow)	-6,179	-5,049	2,384	-1,985	-2,914	-328	5,448	3,313	601	2,761
Cumulative Budget Balance (Inflow - Outflow)	-64,952	-70,000	-67,616	-69,601	-72,515	-72,842	-67,394	-64,081	-63,480	-60,718
Year	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Precipitation Reference Year	**1913**	**1914**	**1915**	**1916**	**1917**	**1918**	**1919**	**1920**	**1921**	**1922**
Rainfall, in Inches	4.8	5.82	3.88	3.64	1.82	6.64	3.66	4.51	7.08	2.11
Precipitation as Percentage of Average	140%	170%	113%	106%	53%	194%	107%	132%	207%	62%
Normal Recharge from Precipitation	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588	8,588
Adjusted Recharge from Precipitation	12,053	14,615	9,743	9,140	4,570	16,674	9,191	11,325	17,779	5,298
Other Groundwater Recharge (All Sources)	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131	5,131
Total Groundwater Recharge	17,184	19,746	14,874	14,271	9,701	21,805	14,322	16,456	22,910	10,429
Non-Project Groundwater Outflow (All Sources)	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329	-11,329
Project Groundwater Outflow (All Cumulative Projects)	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190	-2,190

Table 21. 30-Year Projected CVGB Groundwater Budget in Acre Feet Using Adopted Precipitation and Underflow Recharge Estimates and Assuming a Repeat of the Driest 30 Years on Record at Blythe, with all Cumulative Projects in Place.

Total Groundwater Outflow	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519	-13,519
Budget Balance (Inflow - Outflow)	3,665	6,226	1,355	752	-3,818	8,285	802	2,937	9,390	-3,090
Cumulative Budget Balance (Inflow - Outflow)	-57,053	-50,827	-49,472	-48,720	-52,538	-44,253	-43,450	-40,514	-31,123	-34,213

Analysis Summary

The following provides a summary of the results of the analysis presented above.

- Table 4 shows that under normal precipitation conditions, and using precipitation recharge and the adopted subsurface inflow recharge estimates, the CVGB would have a baseline surplus of approximately 2,390 afy, which means there could be a sustainable yield of groundwater extraction in that amount. Table 5, based on lower precipitation and subsurface inflow estimates (the NPS recharge estimates), shows that the CVGB could already be in an overdraft condition of 6,685 afy, and is and will continue to lose groundwater unless current pumping is curtailed. In this case, any additional extractions would increase the overdraft unless replaced by additional inflow.
- Tables 6 to 9 show that there will be a groundwater deficit in dry years and critical dry years (10 percent and 3 percent probability) under current conditions. The magnitude of the deficit depends on the recharge input assumptions.
- Tables 10 and 11 show that under current extraction conditions a repeat of the worst sustained drought on record at Blythe, 12 years of below-average precipitation, will likely result in cumulative groundwater overdrafts of 31,612 af to 94,682 af. Unless compensated by subsequent high-precipitation years, this would likely become a new baseline groundwater level. This cumulative overdraft would represent roughly 0.2 percent to 0.6 percent of the total groundwater in the basin.
- Table 12 shows that the addition of the Palen Solar Project alone to the existing condition would not create an overdraft in the CVGB, assuming adopted recharge estimates, and would have little effect on the cumulative surplus that is expected. Table 13 shows that using NPS recharge estimates, the Palen Solar Project would contribute about 1 percent to a 30-year projected overdraft.
- Table 15 shows that with all cumulative projects in place, and using adopted recharge estimates, the CVGB would suffer an initial overdraft of about 11,106 af in the fifth year, due to the higher use of water during project construction, and then begin to recover. In other words, after construction is complete, operation water use will be within the safe yield estimate of 2,390 afy. Long-term cumulative operational use is estimated at 2,190 afy, to which the Palen Solar Project would contribute about 1.9 percent. This Palen Solar Project contribution would have little effect on the rate of groundwater use or recovery. At the end of 30 years (the expected life of the Palen Solar Project), the total cumulative deficit would be about 6,114 af. Without the Eagle

Crest Pumped Storage Project the cumulative groundwater balance at the end of 30 years would be a surplus of approximately 63,000 acre feet.

- Using NPS recharge estimates (Tables 5 and 16), the CVGB, now in overdraft, would be in more severe overdraft with cumulative projects in place, resulting in a cumulative 30-year overdraft of 278,364 af, to which the Palen Solar Project would contribute about one percent. Without the Eagle Crest Pumped Storage Project the cumulative groundwater overdraft would be only about 4 percent higher than the overdraft predicted with no cumulative projects at all.
- Table 17 shows that under a repeat of the multiple dry year scenario based on the 1893 to 1904 drought, cumulative projects would exacerbate the cumulative overdraft shown in Table 10. With projects in place and adopted recharge estimates, the cumulative overdraft would be 82,530 af to which the Palen Solar Project would contribute about 3 percent. Using NPS recharge estimates, there would be a cumulative overdraft of 145,600 af at the end of the drought, to which the Palen Solar Project would contribute about 1.5 percent.

5.3 Groundwater Budget Reliability Considerations

The groundwater budgets presented in this section are based on assumptions that could affect the reliability of the budget projections. These assumptions are based on the best available data from the sources cited in this document. The following is a discussion of these assumptions, and other considerations, and their implications on the groundwater budgets.

Recharge from precipitation is an important component of the groundwater budget, and alone can make a difference whether the groundwater basin is in a condition of surplus or overdraft as shown in the dry-year projections presented in Sections 5.1 and 5.2. The amount of recharge from precipitation is difficult to estimate. The estimate used in this analysis, 8,588 afy, represents 3% of the total average annual precipitation on the CVGB watershed, and is considered a reasonable estimate of the reported recharge range from previous studies. The overall groundwater budget is very sensitive to the precipitation input. For instance, if the recharge by precipitation is as low as 2.4% of total annual precipitation (6,198 afy), the baseline groundwater budget given in Table 4 would give a net budget balance of zero, and all project scenarios presented above would result in a groundwater deficit. If recharge from precipitation is as high as 6% of total rainfall, which is within the probable range of recharge estimated by the USGS (USGS, 2007) and CEC (CEC, 2015), there would be no groundwater deficit in any year under the cumulative scenario even assuming the lower subsurface inflow estimates of the NPS.

- The Colorado River Water Use Plan (CRBC, 2000), if implemented, could store up to 150,000 afy in the CVGB. This would be a significant increase in the annual water input to the basin, and considered alone would be sufficient to offset the normal year 30-year deficit projected in Table 16. However, this water would likely not be available except for return to the Colorado River Aqueduct, and is not considered in groundwater budget considerations.
- Precipitation reliability could be uncertain should there be shifts in the future climate of the area. The precipitation record at Blythe (USHCN, 2016) shows an overall increase in precipitation since 1893 (Figure 6, Annual Rainfall at Blythe, California), but the 5-year moving average since 1979 shows a downward trend. There was a similar downward trend from 1940 to 1955, and the low precipitation in the early 1900s implies an even more significant downward trend in the late 1880s. Nevertheless, should the current trend continue, recharge from precipitation could decline, resulting in greater groundwater deficits than those estimated here.

- All other groundwater budget input parameters are best estimates subject to uncertainty. The cumulative project list includes projects that are still under consideration and which could be altered or cancelled in the future. Other projects could be proposed, and projects could use other water sources than the CVGB. Changes in future projects could have substantial effects on the groundwater budget.

6. Summary and Conclusions

It is determined that the Palen Solar Project, as a stand-alone project, can draw all of its anticipated water needs from the CVGB without resulting in an overdraft of the groundwater basin under normal (average precipitation) conditions using adopted inflow rates. As shown in Section 5, the normal-year baseline groundwater budget for the CVGB shows a surplus of 2,390 acre feet (Table 4), which is more than the total yearly need for construction by the PV project, and far more than the annual operating water needs. The total 30-year projected water use of the Palen Solar Project is less than the annual baseline water surplus for the CVGB.

During a dry year, and critical dry year (Tables 6 through 9), the baseline groundwater budget for the CVGB shows a groundwater deficit, to which the Palen Solar project would contribute, increasing the overall deficit from 0.05% to 0.06% of the entire CVGB. The same is true for the multiple dry year analysis.

Cumulative projects, including the Palen Solar Project, would use groundwater ranging from 1,201 afy to 6,451 afy, depending on whether these projects are under construction or in operation (long-term cumulative operation use, not including existing uses, is 2,050 afy). This groundwater use would be more than the estimated CVGB baseline surplus during construction, resulting in a short-term net reduction in groundwater reserves assuming normal precipitation years and adopted recharge estimates, with increased reductions for dry, critical dry, and multiple dry years (Section 5, Table 17). Long-term operational use is less than the safe yield, resulting in near recovery of the CVGB at the end of 30 years.

Dry years will result in a groundwater overdraft. Assuming adopted recharge inputs and long-term cumulative project operational water use, the CVGB would be expected to recover from a single dry year in 16 or 17 years, and from a critical dry year in 21 to 22 years. If cumulative project water use ends after a 30-year project lifespan the recovery time would be much less. It would take about 13 years to recover from the same drought if no new projects are in place and assuming normal precipitation. It should be noted that past precipitation amounts have been episodic. For instance, shortly after the 1893 to 1904 drought there was a period of 13 years with precipitation well above average, except for one year. High precipitation years, especially repeated in this way, would significantly shorten the recovery time from a drought. Simulation from the entire rainfall record at Blythe shows that after a repeat of the 1893 to 1904 drought beginning at the start of construction, with all cumulative projects in place, total recovery of the CVGB would occur approximately 50 years after the start of construction. Further, as described under the dry year analysis above, the dry year and multiple dry year deficits are a small percentage of the total CVGB volume.

Because of the uncertainties involved in the CVGB groundwater basin, the analysis includes a budget that assumes lower recharge rates that have been supported by studies of nearby, but

separate, groundwater basins. Under these recharge assumptions, the CVGB is already in overdraft condition due to existing withdrawals. Any additional projects that use groundwater would contribute to this overdraft. Although the 30-year projected overdraft assuming these recharge rates and cumulative projects would amount to approximately 263,361 af, this amount is relatively small compared to the total volume of the CVGB, representing about 1.7 percent of the total volume available. Calculated evenly over the entire CVGB area, an overdraft of this magnitude could drop overall groundwater surface elevations about 4.3 feet. Much greater drops would be expected within the cone of groundwater depression around each well, possibly reducing well yields in the vicinity.

The overdraft conditions projected from the analysis using the NPS recharge estimates would occur with or without the Palen Solar project. Projected cumulative long-term water extractions by other projects, plus existing extractions, are 315 times operational extractions proposed by the Palen Solar project. The Palen Solar wells, expected to extract about 41 afy long term, would likely have small effect on the overall resource or locally.

In conclusion, depending on recharge assumptions, a sustainable water supply sufficient to meet the water demand of the Palen Solar Project and existing and planned future uses is available in the CVGB assuming normal precipitation during a 30-year period. Temporary overdrafts during cumulative project construction would be recovered by 2036. The Palen Solar Project alone will not produce an overdraft in any year. If groundwater inflow rates are lower than those adopted herein, the basin may already be in overdraft. If in overdraft, the CVGB has ample storage to supply the Palen Solar Project for 30 years without significantly diminishing the resource because application of the most conservative models under cumulative conditions result in an estimated overdraft of less than 2 percent of the resource, with or without the project.

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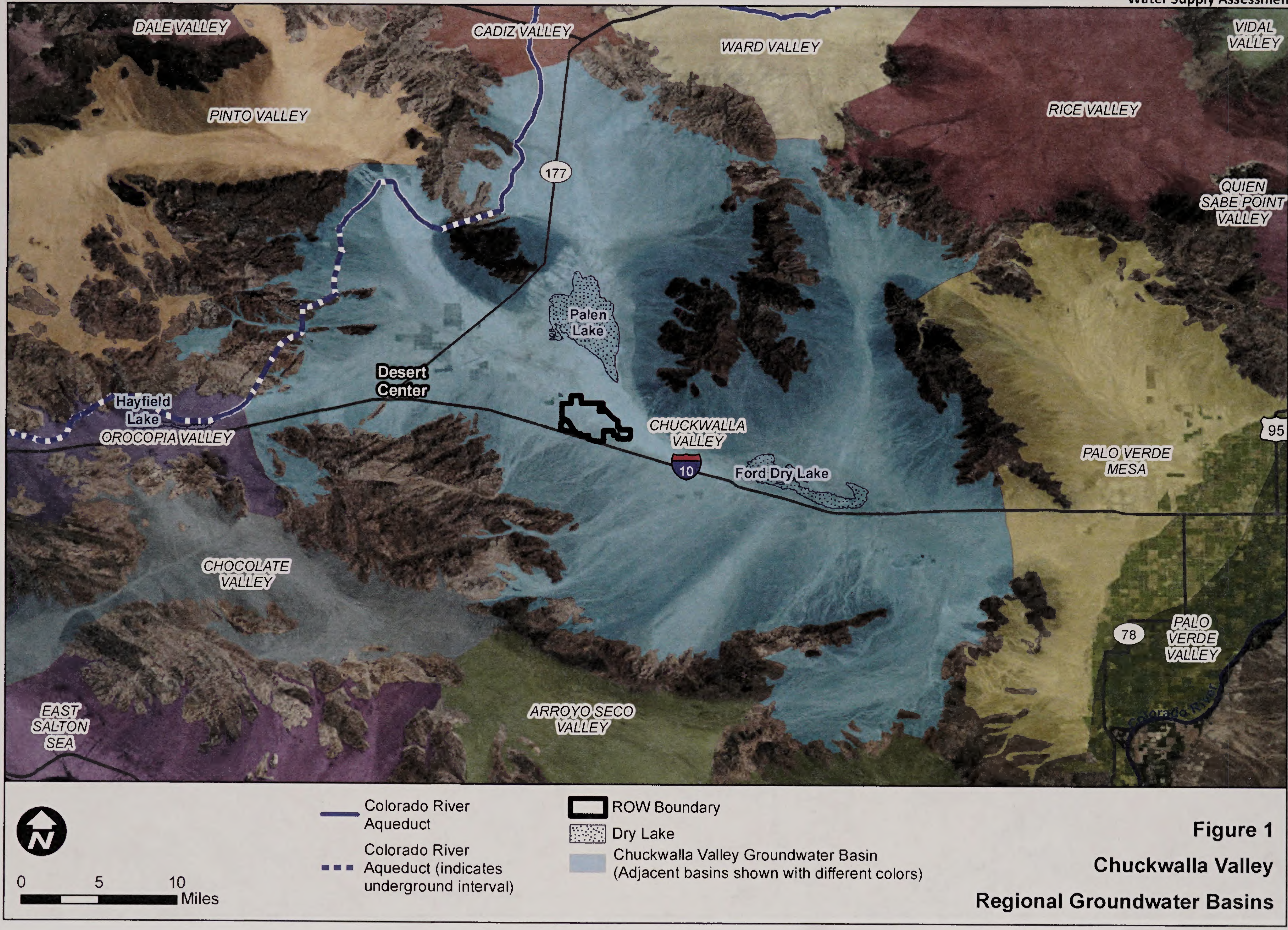
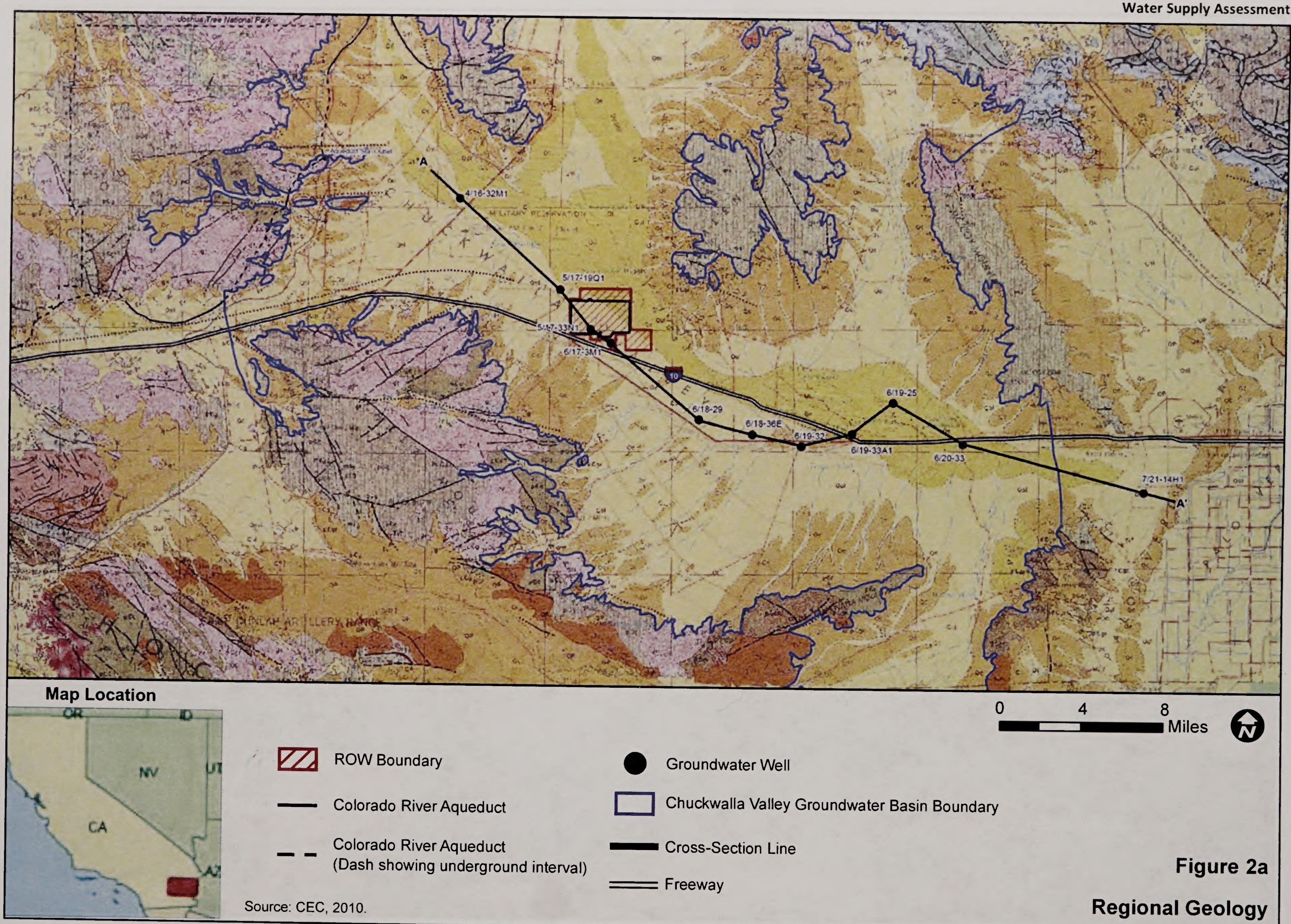


Figure 1
Chuckwalla Valley
Regional Groundwater Basins



Source: CEC, 2010.

Figure 2a

Regional Geology

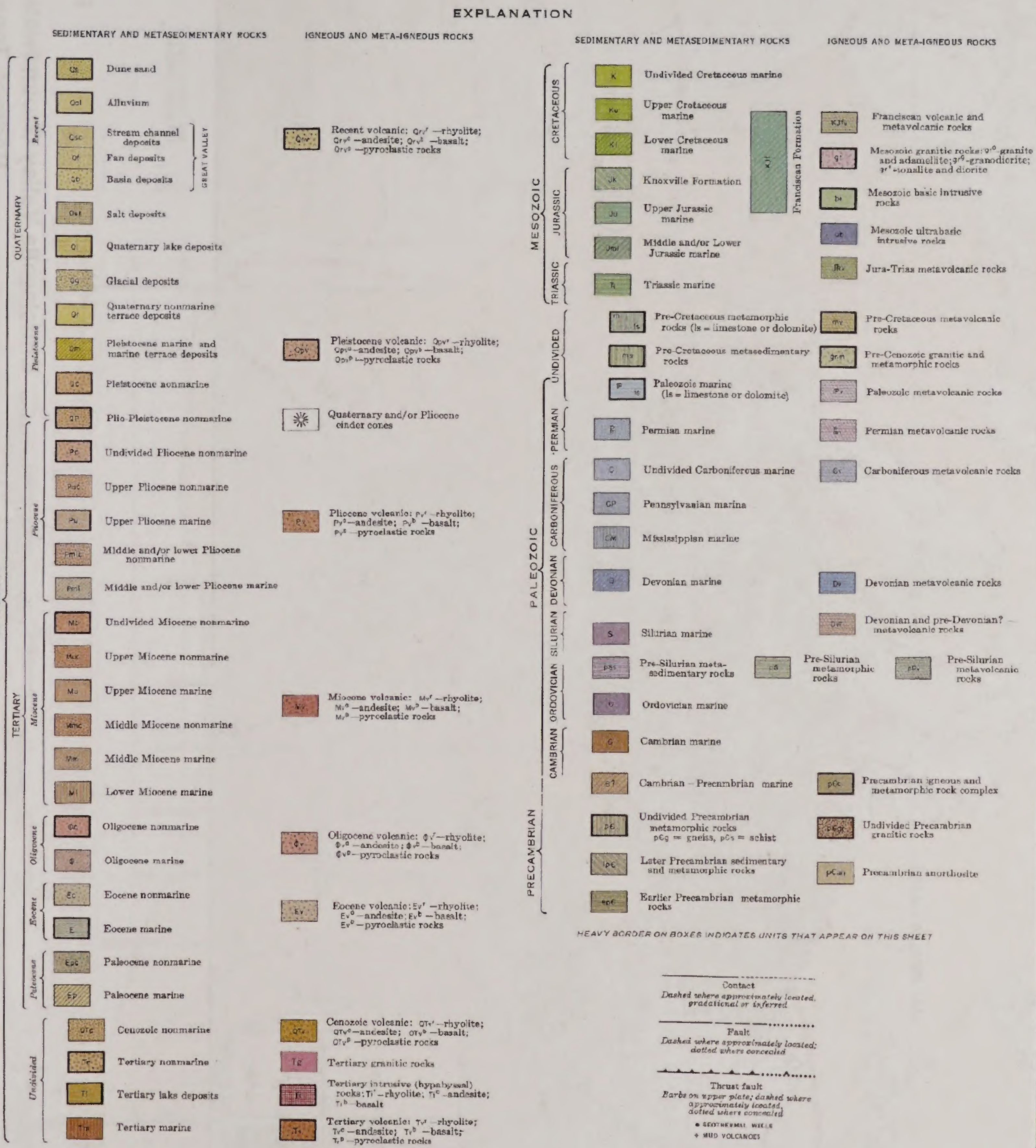
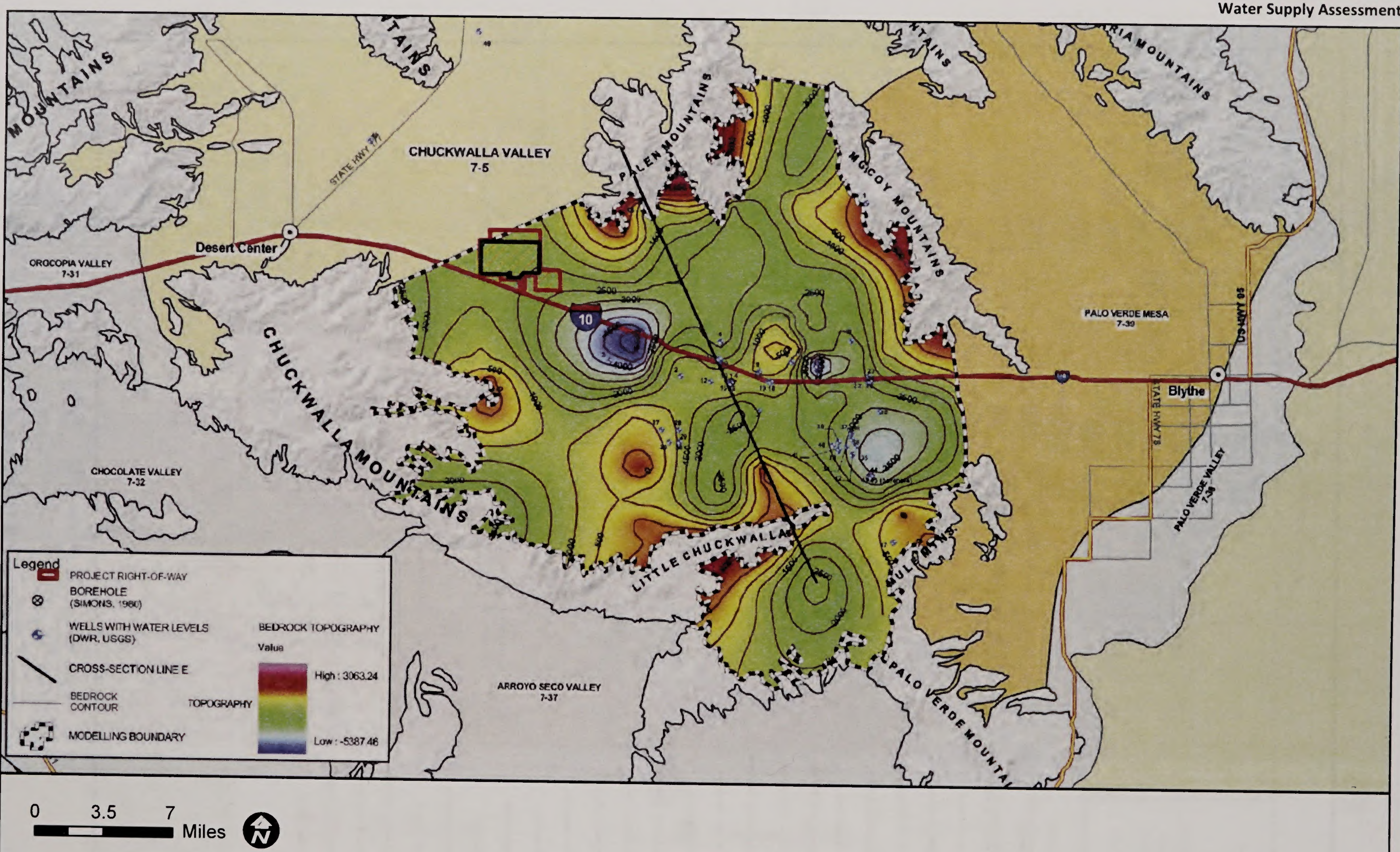


Figure 2b

Regional Gology Legend

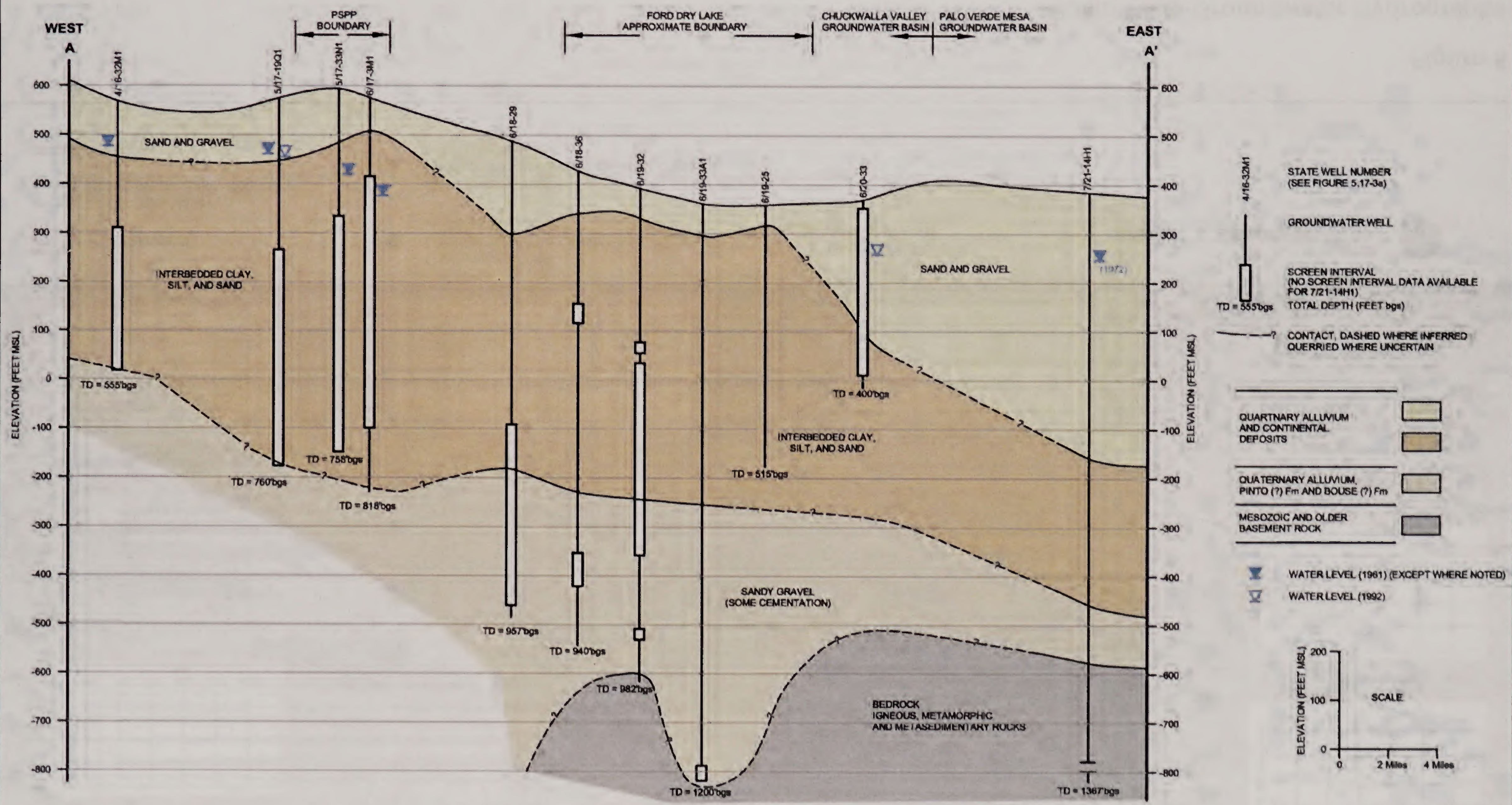
Source: CEC, 2010



Source: CEC, 2010.

Figure 3

Chuckwalla Valley Groundwater Basin Bedrock Topography



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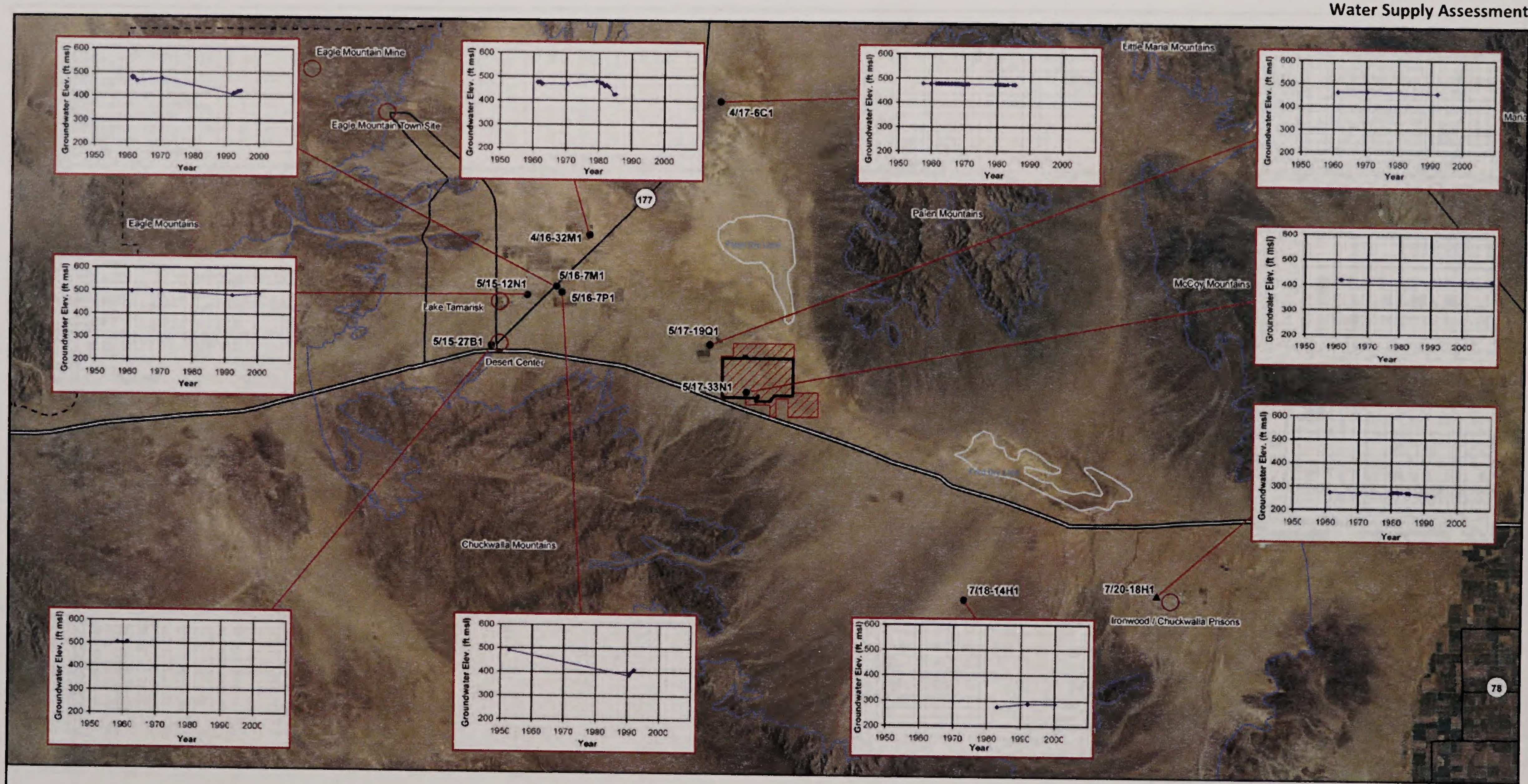
Source: AECOM, 2010.

Figure 4

Chuckwalla Valley Groundwater Basin Cross Section A-A



ROW Boundary

Chuckwalla Valley Groundwater Basin Boundary

Freeway

Groundwater Well Location based on Latitude and Longitude in USGS Database

Groundwater Well Location based on Latitude and Longitude in USGS Database

Geographic/Cultural Area of Interest

0 4 8 Miles

Source: AECOM, 2010.

Figure 5

Basin Wide Groundwater Hydrographs

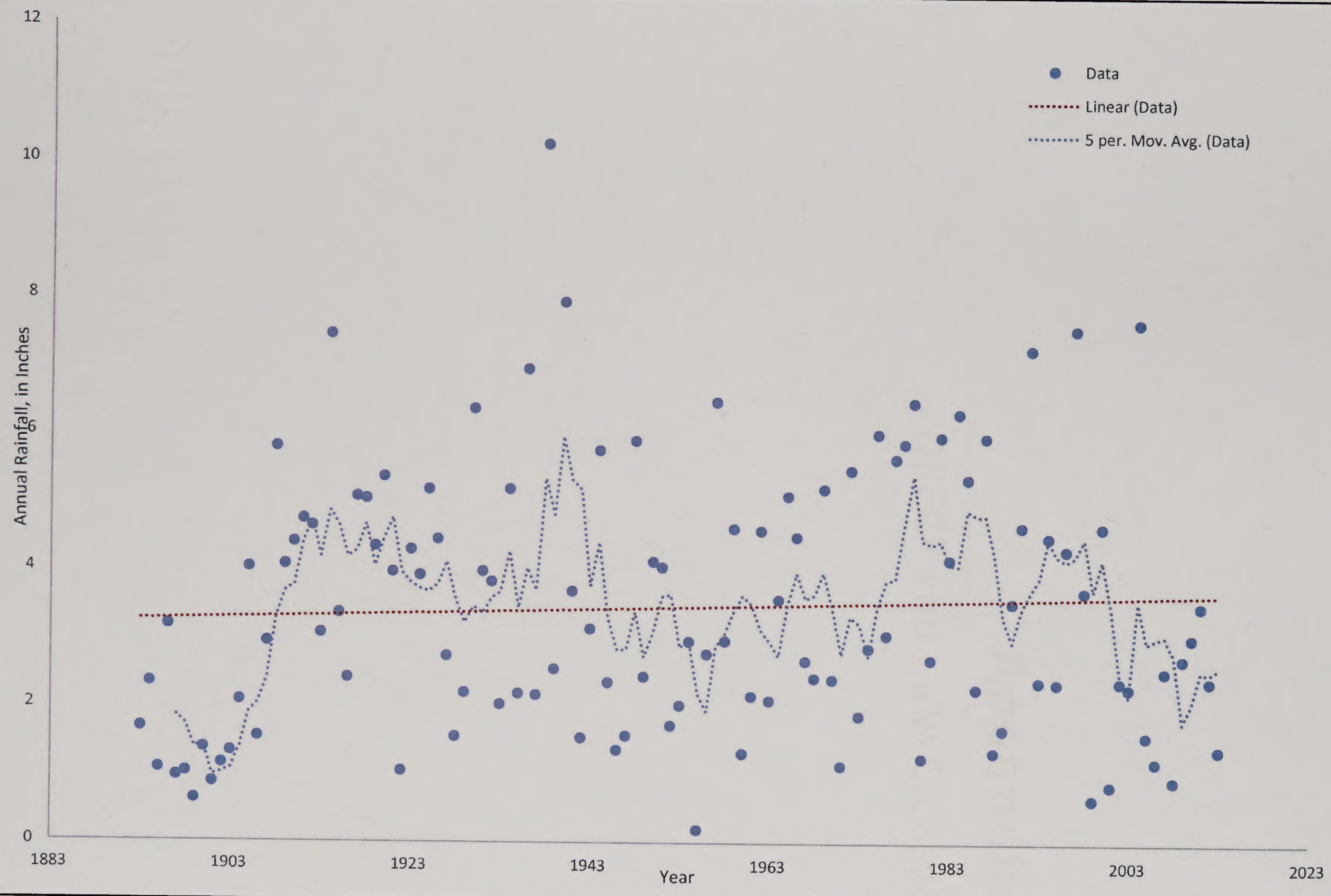


Figure 6

Annual Rainfall at Blythe, California

Appendix H

DRECP and CMA Crosswalk

DRECP Conservation and Management Action (CMA) Crosswalk Tables

This appendix presents information that describes how the Desert Renewable Energy Conservation Plan (DRECP) Conservation and Management Actions (CMAs) relate to the Palen Solar Project. In Section 1, Table 1 is a table that compares the mitigation measures adopted for the Palen Solar Power Project (PSPP) relate to the CMAs adopted as part of the DRECP. In Section 2, Table 2 explains the CMAs that are not applicable to the Palen Solar Project.

1. DRECP CMAs and Palen Solar Power Project Crosswalk

Table 1 lists the Desert Renewable Energy Conservation Plan Conservation and Management Actions (CMA) in comparison with the Mitigation Measures included in the PSPP Final EIS (2011). Additionally, it includes the CMAs that EDF has adopted as part of their Applicant Proposed Measures and therefore as part of the Proposed Action. New or revised mitigation measures included for the Palen Solar Project were not included but may address some of the CMA requirements as appropriate.

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA Wide CMAs			
Biological Resources			
LUPA-BIO-1	Conduct a habitat assessment of Focus and BLM Special-Status Species' suitable habitat for all activities and identify and/or delineate the vegetation types, rare alliances, and special features present using the most current information, data sources, and tools to identify suitable habitat for Focus and BLM Special Status Species. If required by the relevant species specific CMAs, conduct any subsequent protocol or adequate presence/absence surveys to identify species occupancy status and a more detailed mapping of suitable habitat to inform siting and design considerations.	As part of the NEPA review, the developers of the Palen project have conducted multiple surveys of the site to comply with the NEPA and ESA requirements.	Surveys were completed for the PSPP project, the PSGES project, and in 2016 for the Palen Solar Project. Survey protocols and the Survey Work Plan for the Focus and BLM Special Status Species were determined in conjunction with the BLM. **The NEPA/CEQA/ESA requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-2	Designated biologist(s) will conduct activity-specific required biological monitoring during pre-construction, construction, and decommissioning to ensure that avoidance and minimization measures are appropriately implemented and are effective.	BIO-1, Designated Biologist Selection and Qualifications, and BIO-5, Designated Biologist and Biological Monitor Authority. These measures set for the requirements for the designated project biologist and establish the biologists authority for monitoring including halting construction if necessary and notifying the BLM if there is any stoppage.	Mitigation Measures BIO-1 and BIO-5 provide biological oversite to pre-construction, construction, and operations to ensure mitigation is implemented effectively. EDF has stated that it will adopt this CMA as APM-1. **The MM requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-3 Resource Setback Standards	Resource setbacks to avoid and minimize the adverse effects to specific biological resources. Setbacks are not considered additive and are measured as specified in the applicable CMA. Generally, setbacks for the appropriate resources are measured from: ▪ The edge of each of the DRECP desert vegetation types. ▪ The edge of the mapped riparian vegetation or the Federal Emergency Management Agency (FEMA) 100-year floodplain, whichever is greater, for the Mojave River. ▪ The edge of the vegetation extent for specified focus and BLM sensitive plant species. ▪ The edge of suitable habitat or active nest substrates for the appropriate focus and BLM Special-Status Species.	BIO-8, Impact Avoidance and Minimization Measures, require project to generally minimize the impacts to the extent feasible. Multiple measures require specific impact avoidance and minimization features for specific sensitive species such as the desert tortoise, desert kit fox, and burrowing owl. Project is not located in the Mojave River.	There is some microphyll woodland in the three washes that cross the site from the southwest to the northeast. CMA setbacks from the washes would eliminate portions of the site for the project. EDF has proposed a Reduced Alternative that would avoid one of the washes and substantially comply with this CMA. Setbacks for most CMA specified focus plant and wildlife species would not be applicable, because the specified focus species (i.e., those with setback requirements) do not occur on the site. Setbacks for burrowing owl can be modified to comply with CMAs. Compensation would be required for impacts to habitat including the microphyll woodland. **For focus species, the MMs requirements satisfy the resource management goals of the DRECP, with minor revision for burrowing owl. For microphyll woodland, the resource management goals would not be met through compensation so would not be met by the Proposed Action.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-4 Seasonal Restrictions	For activities that may impact Focus and BLM Special -Status Species, implement all required species-specific seasonal restrictions on pre- construction, construction, operations, and decommissioning activities. Alternatively, to avoid a seasonal restriction associated with visual disturbance, installation of a visual barrier may be evaluated on a case-by-case basis.	The PSPP mitigation measures require specific avoidance and minimization measures that include seasonable restrictions and requirements. BIO-19, Special-Status Plan Impact, Avoidance, Minimization and Compensation requires seasonal surveys and avoidance, BIO-15, Pre-construction Nest Surveys and Avoidance Measures, requires seasonable surveys and avoidance. BIO-9 and BIO-10 require a desert tortoise relocation and translocation plan that incorporates all the USFWS guidelines.	Seasonal restrictions and requirements are specified in the mitigation measures and will be further specified in the required mitigation plans. As noted in the CMA, the NEPA document could consider species-specific seasonable restrictions if not already included in the mitigation measures. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-5 Worker Education	All activities, as determined appropriate on an activity-by-activity basis, will implement a worker education program that meets the approval of the BLM.	BIO-6, Worker Environmental Awareness Program (WEAP), requires a training program that includes site-specific biological information, reporting requirements and protocols, information regarding legal protections, and impact minimization measures. The WEAP must be approved by the BLM.	The WEAP will provide worker education with similar requirements as LUPA-BIO-5 and that must be reviewed and approved by the BLM. EDF has stated it will adopt this CMA as BPM-2 with minor modifications. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-6 Subsidized Predators Standards	Subsidized predator standards, approved by BLM, in coordination with the USFWS and CDFW, will be implemented during all appropriate phases of activities to manage predator food subsidies, water subsidies, and breeding sites. Additionally, each activity will provide compensatory mitigation that contributes to LUPA-wide raven management.	BIO-13, Raven Management Plan and Fee, requires the project to implement a raven management plan that is consistent with USFWS guidelines and meets approval of the USFWS and CDFW. The mitigation also requires the project to pay into the REAT Account held by NFWF to support the USFWS Regional Raven Management Program. BIO-8, Impact Avoidance and Minimization Measures, requires the project to minimize standing water and place trash and food-related wastes in self-closing containers.	The Raven Management Plan will detail methods to avoid subsidizing predator standards and must meet requirements established by the USFWS and CDFW. The mitigation requires a payment to the USFWS Raven Management Program which may satisfy the LUPA-wide raven management compensation. BIO-8 will require other standard practices to minimize subsidizing predators. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-7 Restoration of temporary disturbed areas	Where DRECP vegetation types or Focus or BLM Special Status Species habitats may be affected by ground- disturbance and/or vegetation removal during pre-construction, construction, operations, and decommissioning related activities but are not converted by long-term (i.e., more than two years of disturbance) ground disturbance, restore these areas following the standards, approved by BLM authorized officer, following the most recent BLM policies and procedures for the vegetation community or species habitat disturbance/impacts as appropriate.	BIO-8, Impact Avoidance and Minimization Measures, requires the project to implement erosion control measures including restoring all areas subject to temporary disturbance, and specifies that if the measures require use of seed that only locally native plant species be used. Additionally, it requires salvaging topsoil of temporarily disturbed areas such that it can be used during the restoration of these areas. This mitigation measure does not address salvage and relocation of cactus, nolina, and yucca. BIO-7, Biological Resources Mitigation Implementation and Monitoring Plan, require a plan that includes all measures that shall be taken to avoid or mitigate temporary disturbances from construction activities.	The mitigation measures for the Palen project require restoration of temporarily disturbed areas including topsoil salvage and use of appropriate seeds. Additionally, the project owner must complete a Mitigation Implementation and Monitoring Plan, that is approved by the BLM that would detail the mitigation for temporary disturbances. As part of the NEPA process, additional details, such as the salvage of cactus, can be considered. Additionally, EDF is planning to adopt this CMA as APM-3. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-8 General Closure and Decommissioning Standards	All activities that are required to close and decommission the site (e.g., renewable energy activities) will specify and implement project-specific closure and decommissioning actions that meet the approval of BLM, and that at a minimum address the following: ▪ Specifying and implementing the methods, timing, and criteria for success. ▪ Recontouring areas that were substantially altered from their original contour or gradient and installing erosion control measures. ▪ Restoring vegetation as well as soil profiles and functions. ▪ Vegetation restoration will use native vegetation and see composition.	BIO-22, Decommissioning and Reclamation Plan, requires the project owner to submit a plan that must be revised and approved by the BLM prior to the start of construction or at a date agreed to by the BLM.	The mitigation measure does not provide specifications regarding the Decommissioning and Reclamation Plan but does require approval of the plan by the BLM. As the requirements identified in the CMA are the most recent and up to date BLM recommendations, it is likely that the applicant would take them into consideration. EDF has stated that it will adopt this CMA as APM-3 with minor modifications. **The MM requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-9 Water and Wetland Dependent Species Resources	Implement protection for water and wetland dependent resources including: ▪ Standard practices to prevent toxic chemicals, hazardous materials, and other fluids from entering streams, washes, etc. Standards practices include maintaining vehicles, repairing hazardous material spills immediately, drainage, erosion, and sedimentation control actions, etc. ▪ Hydrological studies to determine potential effects to groundwater and surface water. ▪ Avoid evaporation ponds when water could hard birds or terrestrial wildlife. ▪ Ramps that allow egress of wildlife from ponds or other water management infrastructure.	BIO-21, Mitigation for Impacts to State Waters, requires a number of measures to avoid, minimize and mitigate for direct and indirect impacts to waters of the state and satisfy CFG Code sections 1600 and 1607, including preparation of a management plan, preserving downstream flows, BMPs to avoid impacts to waters, notifying if a change of biological conditions or physical conditions. BIO-23, Groundwater-Dependent Vegetation Monitoring, requires monitoring for the project effects on groundwater pumping on groundwater-dependent vegetation unless can provide evidence that the plants source of water is a shallow perched water-bearing zone. The Palen Solar Project does not include the use of an evaporation pond.	The mitigation measures would protect water and wetland dependent resources and include many of the same specifications as the CMA. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-10 Standard Practices for Weed Management.	Integrated weed management actions, will be carried out during all phases of activities, as appropriate, and at a minimum will include the following: ▪ Clean the tires and undercarriage of vehicles entering or reentering the project site to remove potential weeds ▪ Store project vehicles on site in designated areas ▪ Properly maintain vehicle wash and inspection stations ▪ Closely monitor the types of materials brought onto the site ▪ Reestablish native vegetation onsite ▪ Monitor and implement control measures for early detection and eradication of weed invasions ▪ Use certified weed-free mulch, etc.	BIO-14, Weed Management Plan, includes many specific requirements that are similar in intent to the CMA including identifying target weeds, measures to prevent the introduction and spread of weeds, weed control methods, weed monitoring, avoidance and treatment of dense weed populations, cleaning vehicles and equipment, and safe use of herbicides. BIO-19, Special-Status Plan Impact Avoidance, Minimization and Compensation, prohibits erosion and sedimentation control measures from using invasive or non-native plants in seed mixes, or introducing pest plants through contaminated seed or straw, accidental burial by mulches, etc.	The mitigation measures require many of the same Weed Management Practices as the CMA. EDF has stated that it will adopt this CMA as APM-4. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-11 Nuisance Animals and Invasive Species	▪ No fumigant, treated bait, or other means of poisoning nuisance animals including rodenticides will be used in areas where Focus and BLM Special Status Species are known or suspected to occur. ▪ Manage the use of widely spread herbicides and do not apply herbicides effective against dicotyledonous plants within 1,000 feet from the edge of a 100-year floodplain, stream and wash channels, and riparian vegetation or to soils less than 25 feet from the edge of drains. ▪ Minimize herbicide, pesticide, and insecticide treatment in areas that have a high risk for groundwater contamination. ▪ Clean and dispose of pesticide containers and equipment following professional standards. Avoid use of pesticides and cleaning containers and equipment in or near surface or subsurface water. ▪ When near surface or subsurface water, restrict pesticide use to those products labeled safe for use in/near water and safe for aquatic species of animals and plants.	BIO-14, Weed Management Plan, requires the safe use of herbicides including avoiding drift or residual toxicity to special-status species, and prohibits the use of herbicides known to have residual toxicity to be used in natural areas or within engineered channels. BIO-19, Special-Status Plant Impact Avoidance, Minimization, and Compensation, includes a requirement to protect the project from herbicide and soil stabilizer drift.	The mitigation measures include provisions to protect the area against the improper use of herbicides similar to the requirements in the CMAs. The mitigation measures do not address the use of fumigant, treated bait, or other means of poisoning nuisance animals. The use of such options could be considered in the NEPA document. EDF has stated that it will adopt this CMA as APM-5. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-12 Noise	To the maximum extent practicable, locate stationary noise sources that exceed background ambient noise levels away from known or likely locations of focus and BLM sensitive wildlife species and their suitable habitat. Implement engineering controls on stationary equipment to reduce the average noise levels and use noise controls on standard construction equipment.	BIO-8, Impact Avoidance and Minimization Measures, require that the project minimize noise impacts including avoiding loud construction during nesting season near nesting habitat. Other resource specific measures would create non-disturbance buffers to protect the special-status species, such as BIO-18, Burrowing Owl Impact Avoidance, Minimization and Compensation Measures.	Mitigation Measure BIO-8 requires specific noise avoidance measures and other mitigation measures require buffers from sensitive species that would also reduce noise impacts. EDF has stated that it will adopt this CMA as APM-6. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-13 General Siting and Design	Minimize impacts to vegetation types and occupied and suitable habitat for Focus and BLM Special-Status Species. Siting projects along edges of the biological linkages will maximize the retention of microphyll woodlands and will be informed by existing available information on modeled focus and Special-Status habitat. Projects will be sited to maintain the function of connectively and linkages including a 3-mile-wide linkage across Interstate 10 to connect the Chuckwalla and Palen mountains. Delineate areas to be disturbed using temporary construction fencing and flagging. Long-term nighttime lighting should be limited to the minimum necessary for project security and directed away from riparian and wetland vegetation. Restrict construction activity to existing roads, routes, and utility corridors and confine vehicles to designated open routes to the project site. Avoid new roads within Focus and BLM Special-status species suitable habitat and avoid paving roads within identified linkages.	The Palen Solar Project would be located entirely within a Development Focus Area and would avoid the East Riverside DFA Multispecies Linkages identified in Figure D-2 of the LUPA Appendix D. The eastern edge of the project is in close proximity to but not immediately adjacent to the 3-mile wide linkage across the I-10. The project would be partially located on vegetation type and occupied and suitable habitat for some Focus and BLM Special-Status Species. BIO-8, Impact Avoidance and Minimization Measures, would require the applicant to limit disturbance areas and minimize road impacts including clearly flagging and/or staking prior to construction. This measure also requires minimizing lighting impacts to prevent casting light toward wildlife habitat. BIO-19, Special-Status Plant Impact Avoidance, Minimization, and Compensation, requires minimizing and avoiding impacts to plants, including protecting offsite special-status plants to avoid impacts during construction. For direct impacts to vegetation and suitable habitat for Special-Status Species, compensation is required, see for example BIO-12 Desert Tortoise Compensatory Mitigation and BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation.	The project would be sited on vegetation types and occupied and suitable habitat for Focus and BLM Special-Status Species. However, the project is sited within a Development Focus Area and would minimize impacts to the extent feasible and compensate for the loss of habitat as required by the mitigation measures. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-14 General Standard Practices	▪ No feeding wildlife or leaving food or trash ▪ Wildlife will be allowed to leave the site unharmed ▪ Domestic pets are prohibited ▪ Construction materials will be visual checked for wildlife ▪ Steep-walled trenches or excavation will be covered and will be constructed with escape ramps ▪ Minimize natural vegetation removal using crush and drive or cut or mow rather than removing vegetation entirely	BIO-8, Impact Avoidance and Minimization Measures, prohibits feeding wildlife or leaving trash and prohibits bringing pets to the site. It also requires the project to avoid wildlife pitfalls including trapping animals in trenches, pipes, or culverts. Although the original solar trough project required grading the site entirely, the Solar project Plan of Development including using drive and crush techniques and mowing the vegetation onsite to reduce the amount of grading required.	The mitigation measure and current design plan would adhere to the general standard practices required by the CMA. Additionally, EDF has stated that it will adopt this CMA as APM-7. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-15	Use state-of-the-art techniques to minimize new site disturbance, soil erosion, and deposition, soil compaction, disturbance to topography and removal of vegetation.	Palen Solar would use the most up to date techniques designed to minimize soil disturbance as described in their Plan of Development. Grading would be minimized.	While there is no specific mitigation measure that addresses this CMA, EDF has stated that it will adopt this CMA as APM-8. **Therefore, the resource management goals of the DRECP are satisfied.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-16 Activity-Specific Bird and Bat CMAs	Implement appropriate measures as per the most up-to-date BLM state and national policy and guidance, and data on birds and bats, including but not limited to activity specific plans and actions. Measures include: ▪ avoiding high bird and bat movement areas ▪ monitor bird and bat presence during project siting and design ▪ reuse or co-located new transmission facilities ▪ reduce bird and bat collision, avoid guywires ▪ use lighting that does not attract birds, bats, or their prey ▪ implement a robust monitoring system ▪ incorporate bird and bat use and mortality monitoring.	BIO-16, Avian Protection Plan, requires an Avian Protection Plan to monitor the death and injury of birds from collisions to inform an adaptive management program to minimize impacts to avian species. The study must be approved by the BLM and consistent with guidance from the USFWS on development of avian and bat protection plans. The project will not require night lighting per the FAA requirements nor does it require any guywires. The transmission line would be adjacent to the existing Desert Sunlight gen-tie route.	Bio-16 requires many similar recommendations as LUPA-BIO-16. However, BIO-16 does not address bats, it only addresses avian species. The need for mitigation to consider bat species should be considered in the NEPA document based on updated information and the technology change. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-17 Bird and Bat Conservation Strategy	For activities that may result in mortality to Focus and BLM Special–Status bird and bat species, a Bird and Bat Conservation Strategy (BBCS) will be prepared with the goal of assessing operational impacts to bird and bat species and incorporating methods to reduce documented mortality. CMA lists known important focus and BLM Special-Status bird areas but none are in the Palen Solar region.	BIO-16, Avian Protection Plan, requires an Avian Protection Plan to monitor the death and injury of birds from collisions to inform an adaptive management program to minimize impacts to avian species. The study must be approved by the BLM and consistent with guidance from the USFWS on development of avian and bat protection plans	Bio-16 requires an Avian Protection Plan to address operational impacts to birds and that must be approved by the BLM. The USFWS term "Bird and Bat Conservation Strategy" has replaced the earlier term "Avian Protection Plan," but the two documents are otherwise similar, except for the inclusion of bat conservation strategy in newer documents. MM BIO-16 can be revised to include bats and updated terminology. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-RIPWET-1: Riparian and Wetland Vegetation Type CMAs	Riparian and wetland vegetation types will be avoided to the maximum extent practicable except for minor incursions. Setback for different types of desert wash scrub is 200 feet.	Mitigation Measure BIO-24, Remedial Action and Compensation for Adverse Effects to Groundwater-dependent Biological Resources, requires compensation for impacts to microphyll woodland species.	Compensation would be required for impacts to habitat including the microphyll woodland. **For microphyll woodland, the resource management goals of the DRECP would not be met through compensation so would not be met by the Proposed Action.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-DUNE-1: Aeolian Processes	Verify the location and extent of sand resources to determine whether the activity occurs within a sand dune or Aeolian sand transport corridor, if the activity is subject to dune/Aeolian sand transport corridor CMAs, if activity needs to be reconfigured to satisfy avoidance requirements.	No specific mitigation addresses this CMA but the project has already completed extensive surveys of the area and is within the Aeolian sand transport corridor. BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation, requires the project to mitigate for habitat loss including 3:1 mitigation for direct impacts to stabilized and partially stabilized sand dunes; 1:1 mitigation for direct impacts to non-dune MFTL habitat; and 0.5:1 for indirect impacts to stabilized and partially stabilized sand dunes.	The Palen project has already completed numerous surveys of the project site and has concluded that the project is located partially within the Aeolian sand dune corridor. As such, under the DRECP it would be subject to sand transport corridor CMAs. The original Palen Solar Power Project was redesigned to avoid the sand transport corridor Zone II to the extent feasible. **The surveys performed for the Palen project, including the updated Biological Resources Technical Report (2016) satisfy the resource management goal of the DRECP.**
LUPA-BIO-DUNE-2: Sand transport corridor	Activities that potentially affect the amount of sand entering or transported within Aeolian sand transport corridors will be designed and operated to: ▪ Maintain the quality and function of Aeolian transport corridors and sand deposition zones, unless related to maintenance of existing facilities/operations/activities ▪ Avoid a reduction in sand-bearing sediments within the Aeolian system ▪ Minimize mortality to DUNE associated Focus and BLM Special-Status Species	The approved Palen configuration (Alternative 2 or 3) were designed to reduce the effects to the Aeolian sand transport corridors including maintaining the quality and function of the transport corridors and sand deposition zones for the primary sand transport zones. Additionally, BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation, requires the project to mitigate for habitat loss including 3:1 mitigation for direct impacts to stabilized and partially stabilized sand dunes; 1:1 mitigation for direct impacts to non-dune MFTL habitat; and 0.5:1 for indirect impacts to stabilized and partially stabilized sand dunes.	**Although the MMs reduce the effects to sand transport corridor, resource management goals would not be met through compensation so would not be met by the Proposed Action.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-DUNE-3: Site hydrology	Any facilities or activities that alter site hydrology (e.g., sediment barrier) will be designed to maintain continued sediment transport and deposition in the Aeolian corridor in a way that maintains the Aeolian sorting and transport to downwind deposition zones. Site designs for maintaining this transport function must be approved by BLM in coordination with USFWS and CDFW as appropriate.	The Palen Solar Project would be designed to allow sheet flow through the project to maintain the hydrology to the extent feasible. Note – the hydrology on the site runs from the southwest to the northeast, whereas the Aeolian corridor runs from the northwest to the southeast along the northwest corner of the site. Additionally, BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation, requires the project to mitigate for habitat loss including 3:1 mitigation for direct impacts to stabilized and partially stabilized sand dunes; 1:1 mitigation for direct impacts to non-dune MFTL habitat; and 0.5:1 for indirect impacts to stabilized and partially stabilized sand dunes.	**Although the MMs reduce the effects to sand transport corridor, resource management goals would not be met through compensation. However, portions of this CMA were incorporated into APM-49. Although portions of this CMA were incorporated into the APM-49, resource management goals would not be entirely met by the Proposed Action.**
LUPA-BIO-DUNE-4: Mojave Fringe-Toed Lizard (MFTL)	Dune formations and other sand accumulations (i.e., sand ramps, sand sheets) with suitable habitat characteristics for the Mojave fringe-toed lizard (i.e., unconsolidated blow-sand) will be mapped according to mapping standards established by the BLM National Operations Center. For minor incursions into sand dunes and sand transport areas the activity will be sited in the mapped zone with the least impacts to sand dunes and sand transport and Mojave fringe-toed lizards.	No specific mitigation addresses this CMA, but the project has already completed extensive surveys of the area and is within the Aeolian sand transport corridor. The project does incur into the dune habitat but was re-designed to avoid Zone II and is sited primarily in dune Zone III. Additionally, BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation, requires the project to mitigate for habitat loss including 3:1 mitigation for direct impacts to stabilized and partially stabilized sand dunes; 1:1 mitigation for direct impacts to non-dune MFTL habitat; and 0.5:1 for indirect impacts to stabilized and partially stabilized sand dunes.	**Although the MMs reduce the effects to sand transport corridor, resource management goals would not be met through compensation so would not be met by the Proposed Action.**
LUPA-BIO-DUNE-5: MFTL Clearance Survey	If suitable habitat characteristics are identified during the habitat assessment, clearance surveys for Mojave fringe-toed lizard will be performed in suitable habitat areas.	No specific mitigation addresses this CMA.	There is a large amount of MFLT habitat on the site that could require clearance surveys. Clearance surveys were not required as a mitigation measure but EDF is adopting this measure as APM-9. **No MMs address this CMA, but EDF has adopted it as APM-9; therefore, the DRECP goals and objectives would be met by the Proposed Action.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-PLANT-3: suitable habitat	Impacts to suitable habitat for Focus and BLM Special Status plant species should be avoided to the extent feasible, and are limited [capped] to a maximum of 1% of their suitable habitat throughout the entire LUPA Decision Area. The baseline condition for measuring suitable habitat is the DRECP modeled suitable habitat for these species utilized in the EIS analysis (2014 and 2015), or the most recent suitable habitat modeling.	None of the identified focus and special-status plant species occur on the site. BIO-19, Special-Status Plant Impact Avoidance, Minimization, and Compensation, contains BMPs to avoid impacts to plants, avoidance of special status species, and off-site compensation for special-status plants.	As noted, none of the focus and special status plant species occur on the site although some potential habitat occurs on site. EDF has stated that it will reduce the grading and ground disturbance to the extent feasible as noted in the CMA. **Because the species do not occur onsite and the POD for the Palen project includes reduced grading, the Project satisfies the resource management goal of the DRECP.**
LUPA-BIO-SVF-1:	For activity-specific NEPA analysis, a map delineating potential sites and habitat assessment of the following special vegetation features is required: Yucca clones, creosote rings, Saguaro cactus, Joshua tree woodland, microphyll woodland, Crucifixion thorn stands.	No specific mitigation addresses this CMA but the project has already completed extensive surveys of the area. No yucca clones, saguaro cactus, crucifixion thorn, or Joshua tree woodland have been reported on the site. Microphyll woodland was found on the site during surveys and a creosote rings study was already conducted and a map of the locations of the creosote rings was provided.	The Palen project has already completed surveys of the project site and has concluded that the project has some microphyll woodland and some creosote rings. **The surveys and studies performed for the Palen project, including the updated Biological Resources Technical Report (2016) satisfy the resource management goal of the DRECP.**
LUPA-BIO-SVF-3:	Creosote rings larger than 5 meters in diameter (longest diameter if the "ring" forms an ellipse rather than a circle) shall be avoided.	Of the creosote rings found on the site, only one of the 10 has a maximum diameter of 5 meters.	The Palen Project has only one creosote ring that may reach 5 meters in diameter as calculated on a desktop survey. **If the ring is larger than 5 meters, the Proposed Action would not meet the management goal of the DRECP for this CMA as it is not required to avoid this ring.**
LUPA-BIO-SVF-6	Microphyll woodland: impacts to microphyll woodland will be avoided, except for minor incursions	Mitigation Measure BIO-24, Remedial Action and Compensation for Adverse Effects to Groundwater-dependent Biological Resources, requires compensation for impacts to microphyll woodland species.	Compensation would be required for impacts to habitat including the microphyll woodland. **For microphyll woodland, the resource management goals of the DRECP would not be met through compensation so would not be met by the Proposed Action.**
LUPA-BIO-VEG-1	Management of cactus, yucca, and other succulents will adhere to current up-to-date BLM policy	No specific mitigation addresses this CMA.	**The resource management goals for the CMA would not be met through mitigation but the BLM could require the applicant to adhere to any current up-to-date BLM policy in the ROD.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-VEG-2	Promote appropriate levels of dead and downed wood on the ground, outside of campground areas, to provide wildlife habitat, seed beds for vegetation establishment, and reduce soil erosion, as determined appropriate on an activity-specific basis.	No specific mitigation addresses this CMA but the project does not intent to grade the site but rather mow down the vegetation and leave low levels of vegetation as feasible.	The Palen project POD has stated that it plans to reduce the grading as much as feasible and leave vegetation mown where possible. **The POD for the Palen project that includes reduced grading satisfies the resource management goal of the DRECP.**
LUPA-BIO-VEG-3	Allow for the collection of plant material consistent with the maintenance of natural ecosystem processes	Mitigation Measure BIO-19, Special-Status Plant Impact Avoidance, Minimization and Compensation, requires pre-construction seed collection following specified guidelines.	Mitigation Measure BIO-19 requires the project to perform pre-construction seed collection for special-status plants. **The MM requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-VEG-5	All activities will follow applicable BLM state and national regulations and policies for salvage and transplant of cactus, yucca, other succulents, and BLM Sensitive plants.	No specific mitigation addresses this CMA.	EDF has stated that it will adopt this CMA as APM-51. **Because EDF has adopted this CMA as an APM, the Proposed Action satisfies the resource management goal of the DRECP.**
LUPA-BIO-VEG-6	BLM may consider disposal of succulents through public sale, as per current up-to-date state and national policy.	No specific mitigation addresses this CMA.	**The resource management goals for the CMA would not be met through mitigation but the BLM could require consider disposal of succulents through public sale as per up-to-date policy in the ROD.**
LUPA-BIO-IFS-3	All culverts for access roads or other barriers will be designed to allow unrestricted access by desert tortoises and will be large enough that desert tortoises are unlikely to use them as shelter sites	Mitigation Measure BIO-8, Impact Avoidance and Minimization Measures, require the project towner to install a box culvert suitable for desert tortoise passage under the site access road.	Mitigation Measures BIO-8, requires the project to install a box culvert under the access road to allow desert tortoise access. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-IFS-4	Where protocol and clearance surveys are required, install desert tortoise exclusion fencing along the perimeter fences in accordance with the most up-to-day USFWS protocol. Install short-term desert tortoise exclusion fencing around short-term construction and activity areas.	Mitigation Measure BIO-9, Desert Tortoise Protection, requires desert tortoise exclusion fencing using the USFWS 2009 Desert Tortoise Field Manual. The measure allows this to occur during any season with CDFW and USFWS approval. The fencing is required for any areas of disturbance, permanent or temporary and requires security gates to be designed to avoid impacts to desert tortoise. The fence must be inspected regularly. Mitigation Measure BIO-11, Desert Tortoise Compliance Verification, specifies the verification required to make sure the project is minimizing impacts to desert tortoise.	Measures BIO-9 and BIO-12 specify the desert tortoise fencing requirements and ensure that they are following the USFWS 2009 protocol (the most current regulations). The measures specify how inspections will occur and how this information will be provided to the wildlife agencies and the BLM. Additionally, EDF has stated that it will adopt this CMA as APM-10. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-IFS-5	Following clearance surveys, a designated biologist will monitor initial clearing and grading activities to ensure no tortoises were missed.	Mitigation Measure BIO-11, Desert Tortoise Compliance Verification, requires monitoring during vegetation salvage, grubbing, grading and other ground-disturbance construction activities. Monitoring will continue at least once per month after the initial grading.	Mitigation Measure BIO-11 requires the biological monitoring during the initial clearing, grading, and ground disturbance. EDF has stated that it will adopt this CMA as APM-11. **The MM requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-IFS-6	Biological monitoring will occur with any geotechnical boring or geotechnical boring vehicle movement to ensure no desert tortoises are killed or burrows are crushed	Mitigation Measure BIO-8, Impact Avoidance and Minimization Measures, requires monitoring of ground disturbance prior to pre-construction site mobilization including for geotechnical borings.	Mitigation Measure BIO-8 requires monitoring of geotechnical borings and all other activities that could disturb soil, vegetation, or wildlife. EDF has stated that it will adopt this CMA as APM-12. **The MM requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-IFS-7	A designated biologist will accompany any geotechnical testing equipment to ensure no tortoises are killed and no burrows are crushed.	Mitigation Measure BIO-8, Impact Avoidance and Minimization Measures, requires monitoring of ground disturbance prior to pre-construction site mobilization including for geotechnical borings.	Mitigation Measure BIO-8 requires monitoring of geotechnical borings and all other activities that could disturb soil, vegetation, or wildlife. EDF has stated that it will adopt this CMA as APM-13. **The MM requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-IFS-8	Inspect the ground under the vehicle for the presence of desert tortoise any time a vehicle or construction equipment is parked in desert tortoise habitat outside of areas fenced with desert tortoise exclusion fencing. If a desert tortoise is seen, it may move on its own. If it does not move within 15 minutes, a designated biologist may remove and relocate the animal to a safe location.	Mitigation Measure BIO-8, Impact Avoidance and Minimization Measures, requires inspection on the ground beneath any vehicles parked outside desert tortoise fencing exclusion areas. If the tortoise does not move on its own within 15 minutes, a designated biologist may move it following the USFWS Desert Tortoise Field Manual	Mitigation Measure BIO-8 requires monitoring beneath vehicles to avoid any impacts to desert tortoise. EDF has stated that it will adopt this CMA as APM-14. **The MM requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-IFS-9	Vehicular traffic will not exceed 15 miles per hour within the areas not cleared by protocol level surveys where desert tortoise may be impacted	Mitigation Measure BIO-8, Impact Avoidance and Minimization Measures, has a speed limit of 25 miles per hour on maintenance roads for linear facilities and on the access road.	**No MMs set the same speed limit as the CMA, but EDF has adopted it as APM-15; therefore, the DRECP goals and objectives would be met by the Proposed Action.**
LUPA-BIO-IFS-11	If Bendire's thrasher is present, conduct appropriate activity-specific biological monitoring to ensure that Bendire's thrasher individuals are not directly affected by operations (i.e., mortality or injury, direct impacts on nest, eggs, or fledglings).	Bendire's thrasher was not detected on the Palen site and has low potential to be on the site. Mitigation Measure BIO-15, Pre-Construction Nest Surveys and Avoidance Measures, would require surveys for nesting birds if construction activities were to occur during nesting season and buffer zones to protect the nests. Mitigation Measure BIO-16, Avian Protection Plan, requires a plan for reducing effects to birds during operations of the project that would be approved by the BLM, CDFW, and USFWS and consistent with the USFWS guidance on avian and bat protection plans.	Mitigation Measure BIO-15 and BIO-16 require monitoring and protection of nesting birds both during construction and operations of the project. EDF has stated that it will adopt this CMA as APM-16. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-IFS-12	If burrowing owls are present, a designated biologist will conduct appropriate activity-specific biological monitoring to ensure avoidance of occupied burrows and establishment of the 656 feet (200 meter) setback to sufficiently minimize disturbance during the nesting period on all activity sites.	BIO-18, Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures, require surveys for burrowing owls and require avoidance and setbacks from the occupied burrow. The buffer established in the mitigation measure is 250 feet but this buffer would need to be approved by the BLM in consultation with the USFWS and CDFW so may be updated. Monitoring of any construction activities within 500 feet of a burrow would be required.	Mitigation Measure BIO-18 requires avoiding impacts to burrowing owls including buffers around any occupied burrows. While the buffer is less than the setback required by the DRECP, the avoidance plan will be approved by the BLM, in consultation with the USFWS and CDFW, so could update the buffer to the most recent setback recommendations. **The MM requirements satisfy the resource management goals of the DRECP but may be updated to reflect the most recent guidelines.**
LUPA-BIO-IFS-13	If burrows cannot be avoided on-site, passive burrow exclusion by a designated biologist through the use of one-way doors will occur. Confirmation that the burrow is not currently supporting nesting or fledgling activities is required prior to any burrow exclusions or excavations.	BIO-18, Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures, requires a Burrowing Owl Mitigation Plan that would be approved by the BLM in consultation with USFWS and CDFW that includes detailed methods and guidance for passive relocation of burrowing owls, including monitoring and management of the effort.	Mitigation Measure BIO-18 requires a plan for passive relocation of any burrowing owls that must be approved by the BLM who can ensure the measure confirm to the most recent guidelines. EDF has stated that it will adopt this CMA as APM-17. **The MM requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-IFS-24	Activities that may impact nesting golden eagles, will not be sited or constructed within 1-mile of any active or alternative golden eagle nest within an active golden eagle territory	No specific mitigation addresses this CMA.	Palen project is 3 miles from suitable golden eagle nesting habitat so this CMA is not applicable to the Project. **No MMs address this CMA, but EDF has adopted it as APM-18; therefore, the DRECP goals and objectives would be met by the Proposed Action.**
LUPA-BIO-IFS-26	For activities that impact golden eagles, applicants will conduct a risk assessment per the applicable USFWS guidance	Mitigation Measure BIO-25, Golden Eagle Inventory and Monitoring, requires golden eagle inventory during construction to determine if golden eagle territories occur within one mile of the project boundaries. If an occupied nest is detected within one mile of Project boundaries, the project will prepare and implement a Golden Eagle Monitoring and Adaptive Management Plan.	Although Mitigation Measure BIO-25 does not require a risk assessment, it does require monitoring to ensure that impacts to golden eagle nests do not occur. As no occupied nests were found during the surveys performed for the Palen project and in this region, this measure reduces the unanticipated risk to golden eagles. **The MM requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-IFS-28	Conduct 2 years of pre-project golden eagle surveys for projects where there is potential for take of golden eagles.	No specific mitigation addresses this CMA but the project has already completed golden eagle surveys. Additionally, other nearby projects have completed golden eagle surveys. The nearest occupied golden eagle nest was 7 miles away. Mitigation Measure BIO-25, Golden Eagle Inventory and Monitoring, requires golden eagle inventory during construction to determine if golden eagle territories occur within one mile of the project boundaries. If an occupied nest is detected within one mile of Project boundaries, the project will prepare and implement a Golden Eagle Monitoring and Adaptive Management Plan.	The Palen project has already completed surveys for golden eagles near the project site and no occupied nests were found. The project is not expected to cause take of golden eagle. There would be no direct impacts to nests, the nearest suitable nesting habitat is about 3 miles from the site; project activities are unlikely to cause substantial harassment even if golden eagles were to occupy the nearest potential nesting habitat. **The surveys performed for the Palen project, satisfy the resource management goal of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-COMP-1	Impacts to biological resources, identified and analyzed in the activity specific environmental document, from activities in the LUPA Decision Area will be compensated using the standard biological resources compensation ratio, except for the biological resources and specific geographic locations listed as compensation ratio exceptions. ▪ Standard biological resources compensation ration = 1:1 ▪ Desert tortoise designated critical habitat = 5:1 ▪ Desert riparian woodland vegetation types = 5:1	Mitigation Measure BIO-12, Desert Tortoise Compensatory Mitigation, requires 5:1 compensation for critical habitat and 1:1 compensation for every acre outside of critical habitat but inside project footprint. Mitigation Measure BIO-18, Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures, requires compensatory mitigation for impacts to 4 burrowing owls (estimated at 78 acres) Mitigation Measure BIO-19, Special-Status Plan Impact Avoidance, Minimization and Compensation, requires compensatory mitigation for special status plants (if required) at a 3:1 ratio for Rank 1 plants and a 2:1 ratio for Rank 2 plants Mitigation Measure BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation, requires compensation for MFTL and dune habitat at 3:1 ratio for direct impacts to stabilized and partially stabilized sand dunes, 1:1 ratio for direct impacts to non-dune MFTL habitat, and a 0.5:1 ratio for indirect impacts to stabilized and partially stabilized sand dunes Mitigation Measure BIO-21, Mitigation for Impacts to State Waters, requires compensation of a parcel of land that includes state jurisdictional waters per the area of state waters directly or indirectly impacted by the project footprint at a 3:1 ratio	Mitigation Measures BIO-12, BIO-18, BIO-19, BIO-20, and BIO-21 require compensation at ratios similar to the DRECP. The Palen mitigation measures have a higher compensation ration than the DRECP for MFTL and dune habitat. The mitigation measures do not specifically address desert riparian woodland vegetation, but MM BIO-21 requires mitigation at 3:1 for state jurisdictional waters, which would include this habitat. **The MM requirements partially satisfy the resource management goals of the DRECP. The MM would require an additional 380 acres of compensation for the Proposed Action to full meet the management goals for the desert riparian woodland vegetation types.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-COMP-2	Birds and Bats – The compensation for the mortality impacts to bird and bat Focus and BLM Special Status Species from activities will be determined based on monitoring of bird and bat mortality and a fee re-assessed every 5 years to fund compensatory mitigation. The initial compensation fee for bird and bat mortality impacts will be based on pre-project monitoring of bird use and estimated bird and bat species mortality from the activity. Each activity, as determined appropriate by BLM in coordination with USFWS, and CDFW as applicable, will include a monitoring strategy to provide activity-specific information on mortality effects on birds and bats in order to determine the amount and type of compensation required to offset the effects of the activity.	Mitigation Measure BIO-16, Avian Protection Plan, requires the owner to prepare and implement an Avian Protection Plan to monitor the death and injury from collisions with facility features and use this information to inform an adaptive management program to minimize avian impacts. The study design must be approved by the BLM, CDFW and USFWS and consistent with guidance from the USFWS on development of avian and bat protection plans.	Protection measures for avian and bat species would be specified in resource protection plans that would be submitted to BLM and the wildlife managing agencies (CDFW and USFWS) for review and approval. **The MM requirements mostly satisfy the resource management goals of the DRECP for this CMA but do not address the compensatory fee for bird and bat mortality.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-BIO-COMP-3: Golden eagle	BLM and third-party initiated activities, will provide specific golden eagle compensation in accordance with the most up to date BLM or USFWS policies, including applicable USFWS Eagle Conservation Plan Guidance.	Mitigation Measure BIO-25, Golden Eagle Inventory and Monitoring, requires golden eagle inventory during construction to determine if golden eagle territories occur within one mile of the project boundaries. If an occupied nest is detected within one mile of Project boundaries, the project will prepare and implement a Golden Eagle Monitoring and Adaptive Management Plan. Mitigation Measure BIO-16, Avian Protection Plan, requires the owner to prepare and implement an Avian Protection Plan to monitor the death and injury from collisions with facility features and use this information to inform an adaptive management program to minimize avian impacts. The study design must be approved by the BLM, CDFW and USFWS and consistent with guidance from the USFWS on development of avian and bat protection plans.	Protection measures for golden eagle are specified in Mitigation Measure BIO-25 and for avian species in general in BIO-16. The resource protection plans would be submitted to BLM and the wildlife managing agencies (CDFW and USFWS) for review and approval. Habitat compensation for several resource impacts would also provide permanent protection for golden eagle foraging habitat. EDF has stated that it will adopt this CMA as APM-19 with some modifications. **The MM requirements satisfy the resource management goals of the DRECP.**
LUPA-BIO-COMP-4:	Third-party applicant/activity proponents are required to contribute to a DRECP-wide golden eagle monitoring program, if the activity/project(s) has been determined, through the environmental analysis, to likely impact golden eagles.	The project is not likely to directly affect golden eagles (e.g., cause take or harassment), although the project would eliminate golden eagle foraging habitat (subject to compensation requirements found in Mitigation Measures BIO-12, BIO-18, BIO-19, BIO-20, and BIO-21.	EDF has stated that it will adopt this CMA as APM-20 with some modifications. **The MM requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
Air Resources			
LUPA-AIR-1	Apply best management practices on a case by case basis and meet: ▪ Applicable National Ambient Air Quality Standards (Section 109) ▪ State Implementation Plans (Section 110) ▪ Control of Pollution from Federal Facilities (Section 118), including non-point source ▪ Prevention of Significant Deterioration, including visibility impacts to mandatory Federal Class I Areas (Section 160 et seq.) ▪ Conformity Analyses and Determinations (Section 176[c]) ▪ Applicable local Air Quality Management Jurisdictions.	The following mitigation measures apply best management practices to meet national, State, and local air quality standards: ▪ AQ-SC-1, Air Quality Construction Mitigation Manager (AQCMM); ▪ AQ-SC-2, Air Quality Construction Mitigation Plan (AQCMP); ▪ AQ-SC-3, Construction Fugitive Dust Control; ▪ AQ-SC-4, Dust Plume Response Requirement; ▪ AQ-SC-5, Diesel-Fueled Engine Control; ▪ AQ-SC-7, Operation Dust Control Plan; and ▪ AQ-SC-8, CPM Copies of Documents.	Mitigation Measure AQ-SC-1 through AQ-SC-12 were designed in conjunction with the South Coast Air Quality Management District and require best management practices that apply and meet the recommendations given in LUPA-AIR-1. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-AIR-2	Air quality standards for fugitive dust may not exceed local standards and requirements.	▪ Mitigation Measure AQ-SC-3, Construction Fugitive Dust Control requires the minimization of fugitive dust emission creation from construction activities and the prevention of all fugitive dust plumes from leaving the project. ▪ Mitigation Measure AQ-SC-4, Dust Plume Response Requirement, requires the Air Quality Construction Mitigation Manager (AQCMM) or an AQCMM delegate to monitor all construction activities for visible dust plumes and for the AQCMM/Delegate to establish additional mitigation measures in the event that existing mitigation measures are not resulting in effective mitigation. ▪ Mitigation Measure AQ-SC-7, Operation Dust Control Plan, requires the minimization of fugitive dust emission creation from operations and maintenance activities and the prevention of all fugitive dust plumes from leaving the project.	Mitigation Measures AQ-SC-3, AQ-SC-4, and AQ-SC-7 were designed in conjunction with the South Coast Air Quality Management District and detail methods that address fugitive dust control that meet the recommendations given in LUPA-AIR-2. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-AIR-3	Require documentation for activities to include a detailed discussion and analysis of Ambient Air Quality conditions (baseline or existing), National Ambient Air Quality Standards, criteria pollutant nonattainment areas, and potential air quality impacts of the proposed project (including cumulative and indirect impacts and greenhouse gas emissions).	The Palen Solar Project Supplemental EIS/EIR will include documentation of the activities that could result in effects to air quality standards, including a discussion of baseline conditions and the direct, indirect, and cumulative emissions as well as potential greenhouse gas emissions.	**The NEPA and CEQA review and requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-AIR-4	Fugitive dust impacts to air quality must be analyzed for all activities/projects requiring and EIS/EA. The analysis may include modelling of the sources, timing, duration, and transport of PM_{10} and $PM_{2.5}$ emissions off site that occur prior to construction and/or ground disturbance from the activity/project and will identify how the generation and movement of PM_{10} and $PM_{2.5}$ will change during and after construction.	The Palen Solar Project Supplemental EIS/EIR will include an analysis of fugitive dust impacts including modeling of particulate matter during construction. ▪ Mitigation Measure AQ-SC-3, Construction Fugitive Dust Control, requires the AQCMD to submit documentation to the BLM's Authorized Officer in each Monthly Compliance Report that demonstrates compliance with the Air Quality Construction Mitigation Plan mitigation measures for the purposes of minimizing fugitive dust emission creation from construction activities and preventing all fugitive dust plumes from leaving the project. Any deviation from the AQCMP mitigation measures shall require prior BLM Authorized Officer approval.	The NEPA and CEQA review and Mitigation Measure AQ-SC-3 requires documentation that demonstrates compliance with mitigation measures that analyze and minimize fugitive dust emissions created from construction activities. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-AIR-5	A fugitive Dust Control Plan will be developed for all projects where the NEPA analysis shows an impact on air quality from fugitive dust.	▪ Mitigation Measure AQ-SC-3, Construction Fugitive Dust Control, requires compliance with the Air Quality Construction Mitigation Plan mitigation measures for the purposes of minimizing fugitive dust emission creation from construction activities and preventing all fugitive dust plumes from leaving the project ▪ AQ-SC-7, Operation Dust Control Plan, requires the minimization of fugitive dust emission creation from operation and maintenance activities and the prevention of all fugitive dust plumes from leaving the project site and includes all applicable fugitive dust control measures identified in AQ-SC-3.	Mitigation measure AQ-SC-3 and AQ-SC-7 requires the provision of a site Construction and Operations Dust Control Plan and incorporates methods that address fugitive dust control. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
Comprehensive Trails and Travel Management			
LUPA-CTTM-2	Avoid activities that would have a significant adverse impact on use and enjoyment within 0.5 mile from centerline of tier 2 Roads/Primitive Roads, and 300 feet from centerline of tier 3 primitive roads/trails. If avoidance of Tier 2 and 3 roads, primitive roads and trails is not practicable, relocate access to the same or higher standard and maintain the setting characteristics and access to recreation activities, facilities, and destinations.	No specific mitigation addresses this CMA.	There are no Tier 1 or Tier 2 roads/primitive roads, Back Country Byways, or significant linear features that would be affected by the project. The only effects would be to Tier 3 routes. While no mitigation was proposed for this effect, EDF is adopting the CMA DFA-VPL-CTTM-1 as APM-44 with minor modifications which has very similar requirements as this CMA. **No MMs address this CMA, but EDF has adopted similar requirements as APM-44; therefore, the DRECP goals and objectives would be met by the Proposed Action.**
LUPA-CTTM-5	Manage OHV use per the appropriate Transportation and Travel Management Plan/RMP and/or the SRMA Objectives as outlined in Appendix L as Open, Limited or Closed.	No specific mitigation addresses this CMA.	There are no Tier 1 or Tier 2 roads/primitive roads, Back Country Byways, or significant linear features that would be affected by the project. The only effects would be to Tier 3 routes which would be re-routed if appropriate by APM-44. The Project is not within a SRMA. **No MMs address this CMA, but EDF has adopted APM-44 which would relocate primitive roads allowing OHV use to continue; therefore, the DRECP goals and objectives would be met by the Proposed Action.**
Cultural Resources and Tribal Interests			
LUPA-CUL-2	Using relevant archaeological and environmental data, identify priority geographic areas for new field inventory, based upon a probability for unrecorded significant resources and other considerations.	As part of the NEPA process, the site has already been surveyed for cultural resources. Updated cultural resources technical reports are in process of being completed by the project applicant. Mitigation Measure CUL-5, Cultural Resources Monitoring and Mitigation Plan, would require a plan for all known and other cultural resources.	The Palen project has already completed cultural resources surveys at the site and included mitigation for known and other cultural resources during construction. The resources found during the surveys will contribute to the regional database. **The surveys and MM requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-CUL-3	Identify places of traditional cultural and religious importance to federally recognized Tribes and maintain access to these locations for traditional use.	As part of the NEPA process, the site and surrounding areas have been reviewed for TCPs.	The Palen project has already identified places of traditional cultural and religious importance and would not eliminate access to these locations for traditional use. EDF has stated that it will adopt this CMA as APM-21. **The Palen project location would satisfy the resource management goals of the DRECP.**
LUPA-CUL-4	Design activities to minimize impacts on cultural resources including places of traditional cultural and religious importance to federally recognized Tribes.	Mitigation Measure CUL-16, Compliance with BLM Memorandum of Agreement, requires the project applicant to implement the provisions of the MOA. As part of this process the BLM will complete required Tribal consultation.	Protection measures for cultural resources including places of traditional cultural and religious importance will be incorporated into the MOA. EDF has stated that it will adopt this CMA as APM-22. **The MM requirements and MOA will satisfy the resource management goals of the DRECP.**
LUPA-CUL-5	Develop interpretive material to correspond with recreational uses to educate the public about protecting cultural resources and avoiding disturbance of archaeological sites	No specific mitigation addresses this CMA.	The site has would not incorporate any recreational uses once it is a PV project and currently has very limited recreational use; however, EDF has stated that it will adopt this CMA as APM-23. **No MMs address this CMA, but EDF has adopted it as APM-23; therefore, the DRECP goals and objectives would be met by the Proposed Action.**
LUPA-CUL-9	Promote DRECP desert vegetation types/communities by avoiding them where possible, then use required compensatory mitigation, off-site mitigation, and other means to ensure Native American vegetation collection areas and practices are maintained.	Mitigation Measure BIO-8, Impact Avoidance and Minimization Measures, required to project to limit the ground disturbance as much as possible. Offsite mitigation is required by multiple measures, BIO-BIO-12, Desert Tortoise Compensatory Mitigation, Mitigation Measure BIO-18, Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures, Mitigation Measure BIO-19, Special-Status Plan Impact Avoidance, Minimization and Compensation, Mitigation Measure BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation, and Mitigation Measure BIO-21, Mitigation for Impacts to State Waters.	Protection measures for historic resources will be included in the MOA. Mitigation measures will require compensatory mitigation lands will be acquired as specified for multiple species. EDF has stated that it will adopt this CMA as APM-24. **The MM requirements and MOA will satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-CUL-11	Promote and protect desert microphyll woodland vegetation type/communities to ensure Native American cultural values are maintained.	Mitigation Measure BIO-24, Remedial Action and Compensation for Adverse Effects to Groundwater-dependent Biological Resources, requires compensation for impacts to microphyll woodland species.	There is some microphyll woodland in the three washes that cross the site from the southwest to the northeast. Compensation would be required for impacts to habitat including the microphyll woodland. **The MM requirements to compensate for microphyll woodland would satisfy the resource management goals of the DRECP for cultural resources.**
Lands and Realty			
LUPA-LANDS-5	The MUCs used to determine land tenure in the CDCA Plan will be replaced by areas listed in the CMAs below.	The Palen project is located in an area that will be changed from MUC Class L to DFA.	While the project is located in a DFA, if the project is exempt from the DRECP, then it will be addressed as if it were located in MUC Class L although the Supplemental EIS/EIR will acknowledge the DRECP change in land tenure. **The Palen Supplemental EIS/EIR will acknowledge the change in resource management goals of the DRECP.**
LUPA-LANDS-8	The CDCA Plan requirement that new transmission lines of 161kV or above, pipelines with diameters greater than 12 inches, coaxial cables for interstate communications, and major aqueducts or canals for interbasin transfers of water will be located in designated utility corridors, or considered through the plan amendment process outside of designated utility corridors, remains unchanged. The only exception is that transmission facilities may be located outside of designated corridors within DFAs without a plan amendment.	The gen-tie line for the Palen project would be located in a DFA and would be located partially within a designated utility corridor.	Because the project is located within a DFA, it would comply with this CMA. **The Palen Supplemental EIS/EIR will acknowledge the change in resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
Paleontology			
LUPA-PALEO-1	If not previously available, prepare paleontological sensitivity maps consistent with the Potential Fossil Yield Classification for activities prior to NEPA analysis.	As part of the CEQA and NEPA process at the Palen site, a Paleontological Report was prepared including sensitivity maps. ▪ Mitigation Measure PAL-3, Paleontological Resources Monitoring and Mitigation Plan (PRMMP), includes a discussion of the anticipated geologic units expected to be encountered. It also requires that the performance and sequence of project-related tasks, such mapping and data recovery will be performed according to PRMMP procedures. ▪ PAL-7, Paleontological Resources Report (PRR), requires a PRR following completion of ground-disturbing activities that includes an analysis of the collected fossil materials and related information.	The CEQA and NEPA requirements and Mitigation Measures PAL-3 and PAL-7 provide information regarding paleontological sensitivity and the location of encountered paleontological resources. Additionally, EDF has stated that it will adopt this CMA as APM-25. **The Supplemental EIS/EIR and MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-PALEO-2	Incorporate all guidance provided by the Paleontological Resources Protection Act.	The paleontological mitigation measures, PAL-1 through PAL-7, are required to be in accordance with the guidelines of the Society of Vertebrae Paleontology (SVP 1995) and/or approved by the BLM. Mitigation Measure PAL-3 specifies guidelines of the Paleontological Resources Protection Act required during monitoring to reduce impacts to any potential sensitive resources.	The Mitigation Measures and, in particular, PAL-3 detail guidelines that reflect guidance provided by the Paleontological Resources Protection Act. EDF has stated that it will adopt this CMA as APM-26. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-PALEO-3	Ensure proper data recovery of significant paleontological resources where adverse impacts cannot be avoided or otherwise mitigated.	Mitigation Measure PAL-3, PRMMP, requires assurance that the performance and sequence of project-related tasks, such as mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to procedures; PAL-6, Implementation of PRMMP, requires the project owner to ensure that all components of the PRMMP are adequately performed, including the collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.	Mitigation Measures PAL-3 and PAL-6 detail methods of data recovery of significant paleontological resources that meet the recommendations given in LUPA-PALEO-3. EDF has stated that it will adopt this CMA as APM-27. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-PALEO-4	Paleontological surveys and construction monitors are required for ground disturbing activities that require an EIS.	PAL-3, Paleontological Resources Monitoring and Mitigation Plan (PRMMP), requires assurance that the performance and sequence of project-related tasks, such as pre-construction surveys, worker environmental training, flagging or staking, construction monitoring, and mapping and data recovery, will be performed according to PRMMP procedures. PAL-4, Approved Weekly Training Pertaining to Ground Disturbance, requires, the project owner and the PRS to prepare and conduct weekly CPM-approved training prior to ground disturbance and for the duration of construction activities involving ground disturbance. PAL-5, Paleontological Monitoring Activities, requires the PRS and Paleontologic Resource Monitor(s) to monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and auguring in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project.	Mitigation Measures PAL-3, PAL-4, and PAL-5 detail methods that address surveying and monitoring actions prior to, and during, ground disturbing activities that meet the recommendations given in LUPA-PALEO-4. Surveys in the Chuckwalla Valley were already completed for the original project. EDF has stated that it will adopt this CMA as APM-28. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
Soils and Water General			
LUPA-SW-1	Stipulations or conditions of approval for any activity will be imposed that provide appropriate protective measures to protect the quantity and quality of all water resources and any associated riparian habitat.	A number of soil and water mitigation measures are included in the Palen EIS/EIR to protect the quantity and quality of water resources and associated riparian habitat, including: ▪ SOIL&WATER-1, Drainage, Erosion, and Sedimentation Control Plan ▪ SOIL&WATER-4, Groundwater Level Monitoring, Mitigation and Reporting ▪ SOIL&WATER-6, Water Discharge Requirements ▪ SOIL&WATER-14, mitigation of Impacts to the Palo Verde Mesa Groundwater Basin ▪ SOIL&WATER-16, Groundwater Subsidence Monitoring and Action Plan ▪ SOIL&WATER-17, Estimation of Surface Water Impacts ▪ SOIL&WATER-18, Groundwater Quality Monitoring and Reporting Plan Additional biological mitigation measures include mitigation for impacts to microphyll woodlands and waters of the State, including compensation.	The Palen project includes many conditions to protect the quantity and quality of all water resources. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-2	Buffer zones, setbacks, and activity limitations specifically for soil and water (ground and surface) resources will be determined on an activity/site-specific basis through the environmental review process, and will be consistent with the soil and water resource goals and objectives to protect these resources.	A number of soil and water mitigation measures are included in the Palen EIS/EIR to protect the quantity and quality of water resources and associated riparian habitat, including: ▪ SOIL&WATER-1, Drainage, Erosion, and Sedimentation Control Plan ▪ SOIL&WATER-4, Groundwater Level Monitoring, Mitigation and Reporting ▪ SOIL&WATER-6, Water Discharge Requirements ▪ SOIL&WATER-14, Mitigation of Impacts to the Palo Verde Mesa Groundwater Basin ▪ SOIL&WATER-16, Groundwater Subsidence Monitoring and Action Plan ▪ SOIL&WATER-17, Estimation of Surface Water Impacts ▪ SOIL&WATER-18, Groundwater Quality Monitoring and Reporting Plan Additional biological mitigation measures include mitigation for impacts to microphyll woodlands and waters of the State, including compensation.	Many mitigation measures are required to reduce the impacts of the Palen project to soil and water resources. They do not provide specific setbacks or buffer zones to avoid water resources, although a Reduce Alternative may be considered that would avoid the primary wash that cross the project site. Additionally, the Palen Solar Project would be constructed to allow for sheet flow to cross the project site which would reduce the effects to water resources. **The MMs requirements and the Reduced Alternative satisfy the resource management goals of the DRECP.**
LUPA-SW-5	Exceptions to any of the specific soil and water stipulations contained in this section, as well as those listed below under the subheadings "Soil Resources," "Surface Water," and "Groundwater Resources," may be granted by the authorized officer if the applicant submits a plan, or, for BLM-initiated actions, the BLM provides documentation, that demonstrates that impacts are minimal or can be mitigated.		Many mitigation measures are required to reduce the impacts of the Palen project to soil and water resources. With the measures and the NEPA and CEQA review, the impacts to soil and water should be reduced to the extent feasible. **The CMA does not require actions but allows for some flexibility on how to comply with other CMAs. The MMs requirements and the CEQA and NEPA process satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-6	Third party activities will implement up-to-date standard industry construction practices to prevent toxic substances from leaching into the soil	Mitigation Measure SOIL&WATER-1, Drainage, Erosion, and Sedimentation Control Plan requires the project to meet any Riverside County requirements and contain Best Management Practices to manage stormwater during construction and avoid any toxic leaching.	Mitigation Measure SOIL&WATER-1 will require best management practices, erosion control methods, monitoring and other elements to prevent toxic substances from leaching into the soil. Additionally, EDF has stated that it will adopt this CMA as APM-29. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-SW-7	Prepare an emergency response plan, approved by the BLM contaminant remediation specialist, that ensures rapid response in the event of spills of toxic substances over soils.	Mitigation Measure Worker Safety-1 requires a Construction Emergency Action Plan that must be submitted to the Riverside County Fire Department for review and comment prior to submittal to the BLM for approval.	Mitigation measure Worker Safety-1 would require an emergency response plan approved by the BLM. EDF has stated that it will adopt this CMA as APM-30. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-SW-8	Prepare a site plan specific to major soil types present in Wind Erodibility Groups 1 and 2 and in Hydrology Soil Class D to minimize water and air erosion from disturbed soils on activity sites.	Over 50% of the site is located in a highly susceptible to wind erosion. Mitigation Measure AQ-SC-3, Construction Fugitive Dust Control, requires a plan to control dust including wind erosion control techniques such as windbreaks, water, chemical dust suppressants, and/or vegetation. Mitigation Measure SOIL&WATER-1, Drainage, Erosion, and Sedimentation Control Plan requires the project to meet any Riverside County requirements and contain Best Management Practices to manage erosion control.	The mitigation measures require specific practices to reduce wind and water erosion and must incorporate Best Management Practices and be approved by the BLM. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-SW-10	The extent of additional sensitive soil areas shall be mapped if it is anticipated that an activity will impact these resources. To the extent possible, avoid disturbance of desert biologically intact soil crusts, and soils highly susceptible to wind and water erosion.	As part of the environmental review process the Palen project collected two soil samples. Additionally, the site is crossed by the Aeolian sand transport corridor and much of the site is highly susceptible to wind and water erosion. Mitigation Measures AQ-SC-3 and SOIL&WATER-1 require construction fugitive dust control and erosion control taking into consideration the existing soil conditions. The original project was revised to avoid the Aeolian sand transport corridor Zone II to reduce the effects to this soil type.	The mitigation measures require specific practices to reduce wind and water erosion and must incorporate Best Management Practices and be approved by the BLM. The project was revised to reduce the effects to the Aeolian sand transport corridor. However, because much of the site has not be previously disturbed, it would not avoid disturbance of biologically intact soil crusts. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-11	Where possible, side casting shall be avoided where road construction requires cut- and-fill procedures.	Mitigation Measure SOIL&WATER-1, Drainage, Erosion, and Sedimentation Control Plan requires Best Management Practices including when constructing roads such as avoiding side casting.	EDF has stated that it will adopt this CMA as APM-31. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-SW-14	All relevant requirements of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) will be complied with.	Mitigation Measure SOIL&WATER-1, Drainage, Erosion, and Sedimentation Control Plan requires Best Management Practices including to avoid flooding during construction. The Palen Solar Project was redesigned to allow for sheet flow through the project to reduce the impacts during storms. BIO-21, Mitigation for Impacts to State Waters, requires a number of measures to avoid, minimize and mitigate for direct and indirect impacts to waters of the state and satisfy CFG Code sections 1600 and 1607, including preparation of a management plan, preserving downstream flows, BMPs to avoid impacts to waters, notifying if a change of biological conditions or physical conditions. BIO-23, Groundwater-Dependent Vegetation Monitoring, requires monitoring for the project effects on groundwater pumping on groundwater-dependent vegetation unless can provide evidence that the plants source of water is a shallow perched water-bearing zone.	The mitigation measures would protect water and wetland dependent resources and include many of the same specifications as the CMA. EDF has stated that it will adopt this CMA as APM-32. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-SW-15	Surface water diversion for beneficial use will not occur absent a state water right.	No specific mitigation addresses this CMA.	The Palen project would not include surface water diversion for beneficial uses but EDF is adopting this measure as APM-33. **No MMs address this CMA, but EDF has adopted it as APM-33; therefore, the DRECP goals and objectives would be met by the Proposed Action.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-16	The 100-year floodplain boundaries for any surface water feature in the vicinity of the project will be identified. If maps are not available from the Federal Emergency Management Agency (FEMA), these boundaries will be determined via hydrologic modeling and analysis as part of the environmental review process. Construction within, or alteration of, 100-year floodplains will be avoided where possible.	The project does not lie within a federally mapped floodplain but is subject to flooding due to the Corn Springs Wash and other concentration points. Mitigation Measure SOIL&WATER-1, Drainage, Erosion, and Sedimentation Control Plan requires Best Management Practices including to avoid flooding during construction. The Palen Solar Project was redesigned to allow for sheet flow through the project to reduce the impacts during storms.	The project is not within a federally mapped floodplain but is subject to flowing. Mitigation Measure SOIL&WATER 1 would reduce the effects of erosion cause by flooding during construction. The project would allow sheet flow during operations to reduce the effects of changed hydrology. EDF is adopting this measure as APM-34 with a minor modification. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-SW-17	An activity's groundwater extraction shall not contribute to exceeding the estimated perennial yield for the basin in which the extraction is taking place.	Multiple mitigation measures require monitoring and mitigation for impacts to groundwater pumping including: ▪ SOIL&WATER-3, Construction and Operation Water Use ▪ SOIL&WATER-4, Groundwater Level Monitoring, Mitigation and Reporting ▪ SOIL&WATER-14, Mitigation of Impacts to the Palo Verde Mesa Groundwater Basin ▪ SOIL&WATER-16, Groundwater Subsidence Monitoring and Action Plan ▪ SOIL&WATER-17, Estimation of Surface Water Impacts ▪ SOIL&WATER-18, Groundwater Quality Monitoring and Reporting Plan	The project has completed a Water Supply Assessment that indicates that under normal conditions, the basin would accommodate the water needs of the project. The project water use is highest during the 30 months of construction and then reduces significantly for the majority of the life of the project. Mitigation measures would require extensive monitoring and reporting to ensure no localized or broader impacts to the groundwater basin including during drought conditions and any change in recharge in the basin over the life of the project. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-SW-18	Water extracted or consumptively used for the construction, operation, maintenance, or remediation of the project shall be solely for the beneficial use of the project or its associated mitigation and remediation measures, as specified in approved plans and permits		The project would only use water for construction and operation of the project as estimated and stated in the CEQA and NEPA documentation. Given the extensive monitoring required during project construction, the applicant would be required to track all water extracted. EDF is adopting this measure as APM-35. **The project description and MM requirements satisfy the resource management goals of the DRECP**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-19	Water flow meters shall be installed on all extraction wells permitted by BLM.	Mitigation Measure SOIL&WATER-3, Construction and Operation Water Use requires the project owner to install and maintain metering devices as part of the water supply to document water use and to monitor and record in gallons per day the total volumes of water supplied to the project from this water source. The metering devices must be operational for the life of the project.	The mitigation measure requires metering devices on all wells used to supply water to the project. EDF is adopting this measure as APM-36. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-20	After application of applicable avoidance and minimization measures, all remaining unavoidable residual impacts to surface waters from the proposed activity shall be mitigated to ensure no net loss of function and value, as determined by the BLM	A number of soil and water mitigation measures are included in the Palen EIS/EIR to protect surface water resources and associated riparian habitat, including: ▪ SOIL&WATER-1, Drainage, Erosion, and Sedimentation Control Plan ▪ SOIL&WATER-4, Groundwater Level Monitoring, Mitigation and Reporting ▪ SOIL&WATER-6, Water Discharge Requirements ▪ SOIL&WATER-14, Mitigation of Impacts to the Palo Verde Mesa Groundwater Basin ▪ SOIL&WATER-16, Groundwater Subsidence Monitoring and Action Plan ▪ SOIL&WATER-17, Estimation of Surface Water Impacts ▪ SOIL&WATER-18, Groundwater Quality Monitoring and Reporting Plan Additional biological mitigation measures include mitigation for impacts to microphyll woodlands and waters of the State, including compensation. BIO-21, Mitigation for Impacts to State Waters, requires a number of measures to avoid, minimize and mitigate for direct and indirect impacts to waters of the state and satisfy CFG Code sections 1600 and 1607, including preparation of a management plan, preserving downstream flows, BMPs to avoid impacts to waters, notifying if a change of biological conditions or physical conditions	Many mitigation measures are required to reduce the impacts of the Palen project to soil and water resources. Additionally, a Reduce Alternative may be considered that would avoid the primary wash that cross the project site. The Palen Solar Project would be constructed to allow for sheet flow to cross the project site which would reduce the effects to water resources. **The MMs requirements and the Reduced Alternative satisfy the resource management goals of the DRECP. After implementation of the Mitigation Measures, a very small degree of residual surface quality reduction is expected.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-21	Consideration shall be given to design alternatives that maintain the existing hydrology of the site or redirect excess flows created by hardscapes and reduced permeability from surface waters to areas where they will dissipate by percolation into the landscape.	The Palen Solar Project Supplemental EIS/EIR is considering a Reduced Alternative that would avoid placing solar panels on the main wash that crosses the site.	**The Supplemental EIS/EIS NEPA and CEQA process would satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-22	All hydrologic alterations shall be avoided that could reduce water quality or quantity for all applicable beneficial uses associated with the hydrologic unit in the project area, or specific mitigation measures shall be implemented that will minimize unavoidable water quality or quantity impacts, as determined by BLM in coordination with USFWS, CDFW, and other agencies, as appropriate.	A number of soil and water mitigation measures are included in the Palen EIS/EIR to protect surface water resources and associated riparian habitat, including: ▪ SOIL&WATER-1, Drainage, Erosion, and Sedimentation Control Plan ▪ SOIL&WATER-4, Groundwater Level Monitoring, Mitigation and Reporting ▪ SOIL&WATER-6, Water Discharge Requirements ▪ SOIL&WATER-14, Mitigation of Impacts to the Palo Verde Mesa Groundwater Basin ▪ SOIL&WATER-16, Groundwater Subsidence Monitoring and Action Plan ▪ SOIL&WATER-17, Estimation of Surface Water Impacts ▪ SOIL&WATER-18, Groundwater Quality Monitoring and Reporting Plan Additional biological mitigation measures include mitigation for impacts to microphyll woodlands and waters of the State, including compensation. BIO-21, Mitigation for Impacts to State Waters, requires a number of measures to avoid, minimize and mitigate for direct and indirect impacts to waters of the state and satisfy CFG Code sections 1600 and 1607, including preparation of a management plan, preserving downstream flows, BMPs to avoid impacts to waters, notifying if a change of biological conditions or physical conditions	Many mitigation measures are required to reduce the impacts of the Palen project to soil and water resources. Additionally, a Reduce Alternative may be considered that would avoid the primary wash that cross the project site. The Palen Solar Project would be constructed to allow for sheet flow to cross the project site which would reduce the effects to water resources. **The MMs requirements and the Reduced Alternative satisfy the resource management goals of the DRECP.**
LUPA-SW-23	A Water (Groundwater) Supply Assessment shall be prepared in conjunction with the activity's NEPA analysis and prior to an approval or authorization.	The Water Supply Assessment was prepared for the Palen Solar Project and was provided to the BLM and to Riverside County for review.	**The Water Supply Assessment for the Palen Solar Project partially satisfies the resource management goals of the DRECP but does not address all of the requirements in CMA LUPA-SW-23.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-24	A Groundwater Monitoring and Reporting Plan, and Mitigation Action Plan shall be prepared to verify the Water Supply Assessment and adaptively manage water use as part of project operations. Groundwater monitoring includes measuring the effects of a project's groundwater extraction on groundwater surface elevations, groundwater flow paths, changes to groundwater-dependent vegetation, and of aquifer recovery after project decommissioning	A number of soil and water mitigation measures are included in the Palen EIS/EIR to protect groundwater resources and include extensive monitoring, including: ▪ SOIL&WATER-4, Groundwater Level Monitoring, Mitigation and Reporting ▪ SOIL&WATER-6, Water Discharge Requirements ▪ SOIL&WATER-14, Mitigation of Impacts to the Palo Verde Mesa Groundwater Basin ▪ SOIL&WATER-16, Groundwater Subsidence Monitoring and Action Plan ▪ SOIL&WATER-17, Estimation of Surface Water Impacts ▪ SOIL&WATER-18, Groundwater Quality Monitoring and Reporting Plan Groundwater level monitoring includes establishing pre-construction and construction water use, water level trends, establishing a monitoring network, investigate any latency effects from the project pumping, monitoring subsidence, and estimate impacts on surface water.	Many mitigation measures are required to reduce the impacts of the Palen project to groundwater resources. Additionally, a Reduce Alternative may be considered that would avoid the primary wash that cross the project site. The Palen Solar Project would be constructed to allow for sheet flow to cross the project site which would reduce the effects to water resources. **The MMs requirements and the Reduced Alternative satisfy the resource management goals of the DRECP.**
LUPA-SW-25	Where groundwater extraction, in conjunction with other cumulative impacts in the basin, has potential to exceed the basin's perennial yield or to impact water resources, one or more "trigger points," or specified groundwater elevations in specific wells or surface water bodies, shall be established by BLM. If the groundwater elevation at the designated monitoring wells falls below the trigger point(s)(or exceeds the trigger pumping rate), additional mitigation measures, potentially including cessation of pumping, will be imposed.	Mitigation Measure SOIL&WATER-4, Groundwater Level Monitoring, Mitigation and Reporting includes trigger points both for construction and operations including the need to submit a revised monitoring plan with additional wells if the construction shows a water level change above the trigger point.	Mitigation Measure SOIL&WATER-4 includes trigger points for monitoring after which additional mitigation would be required. **The MMs requirements and the Reduced Alternative satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-26	Groundwater pumping mitigation shall be imposed if groundwater monitoring data indicate impacts on water-dependent resources that exceed those anticipated and otherwise mitigated for in the NEPA analysis and ROD, even if the basin's perennial yield is not exceeded.	A number of soil and water mitigation measures are included in the Palen EIS/EIR to protect groundwater resources and include extensive monitoring, including: ▪ SOIL&WATER-4, Groundwater Level Monitoring, Mitigation and Reporting ▪ SOIL&WATER-14, Mitigation of Impacts to the Palo Verde Mesa Groundwater Basin ▪ SOIL&WATER-16, Groundwater Subsidence Monitoring and Action Plan ▪ SOIL&WATER-18, Groundwater Quality Monitoring and Reporting Plan Groundwater level monitoring includes establishing pre-construction and construction water use, water level trends, establishing a monitoring network, investigate any latency effects from the project pumping, monitoring subsidence, and estimate impacts on surface water.	While mitigation measures require monitoring of groundwater pumping and would reduce the effects of groundwater pumping, the mitigation measures do not cover all the potential mitigation the CMA could impose. For example, CMA LUPA-SW-26 would potentially require a contribution to a basin-wide monitoring network that would further provide information regarding the Coachella Valley Groundwater Basin. No similar requirement was included in the measures. **While MMs address portions of this CMA, there are elements in the CMA such as a contribution to a basin-wide network that were not addressed in the measures; therefore, not all the DRECP goals and objectives would be met.**
LUPA-SW-27	Water-conservation measures shall be required in basins where current groundwater demand is high and has the future potential to rise above the estimated perennial yield (e.g., Pahrump Valley).	No specific mitigation addresses this CMA.	As described in the Palen Water Supply Assessment, little is known about the Chuckwalla Valley Groundwater Basin, and estimates for the perennial yield vary widely. As such, this CMA could be applicable to the Project but may not be. Monitoring required for the project will help inform the BLM regarding the basin. Regardless, EDF is adopting this measure as APM-37. **No MMs address this CMA, but EDF has adopted it as APM-37; therefore, the DRECP goals and objectives would be met by the Proposed Action.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-30	Activities shall comply with local requirements for any long term or short term domestic water use and wastewater treatment.	Mitigation Measure SOIL&WATER-7, Septic System and Leach Field Requirements states that the project owner will comply with Riverside County Ordinance Code Title 8, Chapter 8.124 and the California Plumbing Code (California Code of Regulations Title 24, Part 5) regarding sanitary waste disposal facilities such as septic systems and leach fields.	Mitigation Measure SOIL&WATER-7 requires the project to comply with County and State regulations regarding septic systems. EDF is adopting this measure as APM-38. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-SW-31	The siting, construction, operation, maintenance, remediation, and abandonment of all wells shall conform to specifications contained in the California Department of Water Resources Bulletins #74-81 and #74-90 and their updates.	Mitigation Measure SOIL&WATER-2, Groundwater Wells, Pre-Well Installation, requires the wells be according to the County permit conditions and ensure County well standards for the life of the well.	Mitigation Measure SOIL&WATER-2 does not speak to CDWR Bulletins and abandonment of the wells but EDF is adopting this measure as APM-39. **The MMs requirements do not specifically address these requirements but EDF has adopted it as APM-33; therefore, the DRECP goals and objectives would be met by the Proposed Action.**
LUPA-SW-32	The CMA requires to determine whether activity/project-related pumping would result in the extracted water being replaced by water drawn from the Colorado River and if so, require the applicant to offset or otherwise mitigate the volume of water causing drawdown below the Accounting Surface.	The Palen NEPA and CEQA review found that the cumulative effects of the project may indirectly effect the Palo Verde Mesa Groundwater Basin by inducing underflow from the Colorado River. Mitigation Measure SOIL&WATER-14, Mitigation of Impacts to the Palo Verde Groundwater Basin, would require the applicant to acquire offsets for effects on the Lower Colorado River water. Mitigation Measure SOIL&WATER-17 allows the applicant to refine the estimates of the amount of induced Colorado River underflow through computer modeling analysis and adjust the required acquisition of entitlements or offsets to Lower Colorado River water accordingly.	Mitigation Measure SOIL& WATER-14 would require the project to offset water drawn from the Colorado River and SOIL&WATER-17 would allow the applicant to further measure the induced Colorado River underflow. EDF is adopting this measure as APM-40. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-SW-35	For projects in the vicinity of certain national parks, including Joshua Tree National Park, the CMA requires an analysis that looks at potential impacts to the groundwater basin including: ▪ Potential impacts to water balance ▪ A map identifying all potentially impacted surface water ▪ Any project-related modifications to surface water resources ▪ Analysis of any potential impacts on perennial streams, intermittent streams, and ephemeral drainages that could negatively impact natural riparian buffers ▪ Impacts of any project proposed truncation, realignment, channelization, lining, or filling of surface water resources that could change drainage patterns, reduce available riparian habitat, decrease water storage capacity, or increase water flow velocity or sediment deposition ▪ Any potential indirect project-related causes of hydrologic changes ▪ Alternatives and mitigation measures proposed to reduce or eliminate such impacts	The Supplemental EIS/EIR will consider the effects on the Chuckwalla Valley groundwater basin and includes Mitigation Measures to monitoring any effects of the project during construction and operations including: ▪ SOIL&WATER-4, Groundwater Level Monitoring, Mitigation and Reporting ▪ SOIL&WATER-6, Water Discharge Requirements ▪ SOIL&WATER-14, Mitigation of Impacts to the Palo Verde Mesa Groundwater Basin ▪ SOIL&WATER-16, Groundwater Subsidence Monitoring and Action Plan ▪ SOIL&WATER-17, Estimation of Surface Water Impacts ▪ SOIL&WATER-18, Groundwater Quality Monitoring and Reporting Plan Groundwater level monitoring includes establishing pre-construction and construction water use, water level trends, establishing a monitoring network, investigate any latency effects from the project pumping, monitoring subsidence, and estimate impacts on surface water.	The Supplemental EIS and the EIR will consider potential effects of groundwater pumping for the project on nearby wells. The project would not have an impact on surface or groundwater within Joshua Tree National Park which is underlain by a different groundwater basin, the Pinto Valley Groundwater Bain. Continuous groundwater monitoring will confirm any project impact to wells closer to the project than the Joshua Tree National Park and would require adjustment if the monitoring found a drawdown. EDF is adopting this measure as APM-41 with modifications. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-VRM-1	Manage Visual Resources in accordance with the VRM classes shown on Figure 9.	Mitigation Measure VIS-1, Surface Treatment of Project Structures and Buildings, requires treating the surfaces of all project structures and buildings visible to the public such that a) their colors minimize visual intrusion and contrast by blending with/matching the existing characteristic landscape colors; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with local policies and ordinances. VIS-4, Project Design, requires the project owner, to the extent possible, to use proper design fundamentals to reduce the visual contrast to the characteristic landscape.	Under the DRECP LUPA, the Palen site VRM would be Class IV which allows for a high level of change. However, because the Palen project is not subject to the DRECP, it will be considered under the previous classification of VRM Class III objective, which allows for a moderate level of change to the characteristic landscape while partially retaining the existing character of the landscape and any changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. Mitigation measures VIS-1 and VIS-4 detail methods that meet recommendations given in LUPA-VRM-1. EDF is adopting this measure as APM-42. **The MMs requirements satisfy the resource management goals of the DRECP.**
LUPA-VRM-2	Ensure that activities within each of the VRM Class polygons meets the VRM objectives described above, as measured through a visual contrast rating process.		Under the DRECP LUPA, the Palen site VRM would be Class IV which allows for a high level of change. However, because the Palen project is not subject to the DRECP, it will be considered under the previous classification of VRM Class III objective, which allows for a moderate level of change to the characteristic landscape while partially retaining the existing character of the landscape and any changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. Mitigation measures VIS-1 and VIS-4 detail methods that meet recommendations given in LUPA-VRM-1. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-VRM-3	Ensure that transmission facilities are designed and located to meet the VRM Class objectives for the area in which they are located. New transmission lines routed through designated corridors where they do not meet VRM Class Objectives will require RMP amendments to establish a conforming VRM Objective. All reasonable effort must be made to reduce visual contrast of these facilities in order to meet the VRM Class before pursing RMP amendments.	VIS-1, Surface Treatment of Project Structures and Buildings, requires the transmission line conductors to be non-specular and non-reflective and the insulators to be non-reflective and non-refractive.	The Palen project has a classification of VRM Class III objective, which allows for a moderate level of change to the characteristic landscape while partially retaining the existing character of the landscape and any changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. VIS-1 requires transmissions line conductors and insulators to not exceed a moderate level of change to the characteristic of the landscape. **The MMs requirements satisfy the resource management goals of the DRECP.**
Transmission CMAs			
LUPA-TRANS-BIO-1	Where feasible and appropriate for resource protection, site transmission activities along roads or other previously disturbed areas to minimize new surface disturbance, reduce perching opportunities for the Common Raven, and minimize collision risks for birds and bats	No specific mitigation addresses this CMA but the line has been sited to follow an existing road and parallel an existing transmission line where available.	**While there are no MMs that address this CMA, the project design follows existing roads and transmission lines where available. The Proposed Action would satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-TRANS-BIO-4	Siting of transmission activities will be prioritized within designated utility corridors, where possible, and designed to avoid, where possible, and otherwise minimize and offset impacts to sand transport processes in Aeolian corridors, rare vegetation alliances and Focus and BLM Special Status Species.	The gen-tie line would be partially located in a designated corridor, would partially avoid the sand transport corridor, and would avoid Focus and BLM Special Status Species. Impacts of the gen-tie line would be reduced by Mitigation Measure BIO-8, Impact Avoidance and Minimization Measures, required to project to limit the ground disturbance as much as possible. Offsite mitigation for all ground disturbance is required by multiple measures, BIO-BIO-12, Desert Tortoise Compensatory Mitigation, Mitigation Measure BIO-18, Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures, Mitigation Measure BIO-19, Special-Status Plan Impact Avoidance, Minimization and Compensation, Mitigation Measure BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation, and Mitigation Measure BIO-21, Mitigation for Impacts to State Waters.	Mitigation measures will require reducing impacts of the gen-tie to the extent feasible and compensatory mitigation lands will be acquired as specified for multiple species. **The MM requirements will satisfy the resource management goals of the DRECP.**
LUPA-TRANS-CUL-1	For transmission (and renewable energy) activities, require the applicant to pay all appropriate costs associated with analysis of the resources, sensitivity analysis, Section 106 process, and update to the cultural resources geodatabase.	The BLM has an existing cost recovery agreement with EDF for the Palen project. The geodatabase is not yet available; however, the cost-recovery agreement covers the other work the BLM is performing.	**The existing cost-recovery agreement covers the resource management goals of the DRECP.**
LUPA-TRANS-CUL-2	A compensatory mitigation fee will be required within the LUPA Decision Area to address cumulative and some indirect adverse effects to historic properties. The mitigation fee will be calculated in a manner that is commensurate to the size and regional impacts of the project.	Mitigation Measures CUL-1, Prehistoric Trails Network Cultural Landscape Documentation and NRHP Nomination, and CUL-2, Desert Training Center California-Arizona Maneuver Area Cultural Landscape require compensatory fees to be paid for the cumulative impact to these resources.	**The compensatory fees addressed in Mitigation Measure CUL-1 and CUL-2 may no longer be applicable due to updated information regarding the cultural resources in the site. Additionally, the DRECP compensatory mitigation fee has not yet been determined by the BLM. As the Section 106 process is ongoing, this type of a fee may be included in the current Palen project but will be determined during the Section 106 consultation process. The resource management goals of the DRECP will be addressed during the Section 106 process.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-TRANS-CUL-3	For transmission (and renewable energy) activities, the management fee rate will be determined through the NHPA programmatic Section 106 consultation process that will be completed as part of the DRECP land use plan amendment.	Mitigation Measures CUL-1, Prehistoric Trails Network Cultural Landscape Documentation and NRHP Nomination, and CUL-2, Desert Training Center California-Arizona Maneuver Area Cultural Landscape require compensatory fees to be paid for the cumulative impact to these resources.	**The compensatory fees addressed in Mitigation Measure CUL-1 and CUL-2 may no longer be applicable due to updated information regarding the cultural resources in the site. Additionally, the DRECP compensatory mitigation fee has not yet been determined by the BLM. As the Section 106 process is ongoing, this type of a fee may be included in the current Palen project but will be determined during the Section 106 consultation process. The resource management goals of the DRECP will be addressed during the Section 106 process.**
LUPA-TRANS-CUL-5	For transmission (and renewable energy) activities, provide a statistically significant sample survey as part of the pre-application process, unless the BLM determines the DRECP geodatabase and other sources are adequate to assess cultural resources sensitivity of specific footprints.	As part of the NEPA process, cultural resources surveys have already been completed along the entire length of the gen-tie alignment.	**The cultural resources survey already completed for the NEPA process covers the resource management goals of the DRECP.**
LUPA-TRANS-CUL-6	For transmission (and renewable energy) activities, provide justification in the application why the project considerations merit moving forward if the specific footprint lies within an area identified or forecast as sensitive for cultural resources by the BLM.	Mitigation Measure CUL-5, Cultural Resources Monitoring and Mitigation Plan, requires impact protocols for all known resources and must be approved by the BLM, CUL-7, Worker Environmental Awareness Program (WEAP), requires training workers regarding sensitive cultural resources, CUL-8, Construction Monitoring Program, requires monitoring to prevent impacts to undiscovered resources and ensure that known resources are not impacted in an unanticipated manner, CUL-9, Authority to Halt Construction: Treatment of Discoveries grants the authority to halt construction in the event that a cultural resource is found, CUL-10, Flag and Avoid, requires resources in the transmission line to be flagged and avoided when they can be spanned rather than impacted.	Mitigation measures will require reducing impacts of the gen-tie to cultural resources to the extent feasible including spanning the resources when feasible. **The MM requirements will satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
LUPA-TRANS-CUL-7	For transmission (and renewable energy) activities, complete the NHPA Section 106 Process as specified in 36 CFR Part 800, or via an alternate procedure, allowed for under 36 CFR Part 800.14 prior to issuing a ROD or ROW grant on any utility-scale renewable energy or transmission project.	The Palen Project is in the process of completing the Section 106 process.	**The Palen project is in the process of completing the Section 106 process as required under the management goals of the DRECP.**
Compensation			
LUPA-COMP-1	For third party actions, compensation activities must be initiated or completed within 12 months from the time the resource impact occurs.	Mitigation Measure BIO-29 allows for phasing of the project disturbance area and associated compensation. Compensation in the form of security must be provided no less than 30 days prior to beginning Project ground-disturbing activities and verification of the actual security must be provided no later than 7 days prior to beginning ground-disturbance activities for each phase. Compensation activities must be completed within 18 months of the start of ground-disturbing activities for each phase.	Mitigation Measure BIO-29 would require the compensation requirements to be initiated prior to the start of ground-disturbing activities and finished within 18 months of the start of ground disturbance. **The MM requirements will satisfy the resource management goals of the DRECP.**
Development Focus Areas and Variance Process Lands CMAs			
DFA-VPL-BIO-DUNE-1	Activities in DFAs will be sited to avoid dune vegetation (i.e., North American Warm Desert Dune and Sand Flats). Unavoidable impacts to dune vegetation will be limited to transmission projects, except transmission substations, and access roads that will be sited to minimize unavoidable impacts	The project does incur into the dune habitat but was re-designed to avoid Zone II and is sited primarily in dune Zone III. Additionally, BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation, requires the project to mitigate for habitat loss including 3:1 mitigation for direct impacts to stabilized and partially stabilized sand dunes; 1:1 mitigation for direct impacts to non-dune MFTL habitat; and 0.5:1 for indirect impacts to stabilized and partially stabilized sand dunes.	**Although the MMs reduce the effects to sand transport corridor, resource management goals would not be met through compensation so would not be met by the Proposed Action.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
DFA-VPL-BIO-DUNE-2	Within Aeolian corridors that transport sand to dune formations and vegetation types downwind inside and outside of the DFAs, all activities will be designed and operated to facilitate the flow of sand across activity sites, and avoid the trapping or diverting of sand from the Aeolian corridor. Buildings and structures within the site will take into account the direction of sand flow and, to the extent feasible, build and align structures to allow sand to flow through the site unimpeded. Fences will be designed to allow sand to flow through and not be trapped.	No specific mitigation addresses this CMA but the project has already completed extensive surveys of the area and is within the Aeolian sand transport corridor. The project does incur into the dune habitat but was re-designed to avoid Zone II and is sited primarily in dune Zone III. Additionally, BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation, requires the project to mitigate for habitat loss including 3:1 mitigation for direct impacts to stabilized and partially stabilized sand dunes; 1:1 mitigation for direct impacts to non-dune MFTL habitat; and 0.5:1 for indirect impacts to stabilized and partially stabilized sand dunes.	**Although the MMs reduce the effects to sand transport corridor, resource management goals would not be met through compensation so would not be met by the Proposed Action.**
DFA-VPL-BIO-IFS-1	To the maximum extent practicable activities will be sited in previously disturbed areas, areas of low quality habitat, and areas with low habitat intactness in desert tortoise linkages and the Ord-Rodman TCA	Mitigation Measure BIO-8, Impact Avoidance and Minimization Measures, require the project towner to install a box culvert suitable for desert tortoise passage under the site access road. Mitigation Measure BIO-9, Desert Tortoise Protection, require the project to manage the construction and related facilities to avoid or minimize impacts to desert tortoise. Mitigation Measure BIO-12, Desert Tortoise Compensatory Mitigation, requires the applicant to fully mitigate for habitat loss and potential take of desert tortoise and will be adjusted to the project boundaries. Offsite mitigation for all ground disturbance is required by multiple measures, BIO-BIO-12, Desert Tortoise Compensatory Mitigation,	The project is sited in an area that is desert tortoise habitat but lower quality. No live tortoise was found on the sites during the surveys performed in 2009, 2010, and 2016 and minimal tortoise sign were found. **The project is sited in lower quality desert tortoise habitat and the MM requirements will satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
DFA-VPL-BIO-FIRE-1	Implement site-specific fire prevention/protection actions particular to the construction and operation of renewable energy and transmission project that include procedures for reducing fires while minimizing the necessary amount of vegetation clearing, fuel modification, and other construction-related activities. At a minimum these actions will include designating site fire coordinators, providing adequate fire suppression equipment (including in vehicles), and establishing emergency response information relevant to the construction site.	Mitigation Measures WORKER-1, Project Construction Safety and Health Program, requires a Construction Fire Prevention Plan, that must be submitted to the Riverside County Fire Department for review and comment prior to submittal to the BLM.	Mitigation Measure WORKER-1 would require a Construction Fire Prevention Plan that would reduce the risk of fires and would require coordination with Riverside County Fire Department. EDF is adopting this measure as APM-43 with minor modifications. **The MM requirements will satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
DFA-VPL-BIO-COMP-1	Impacts to biological resources from all activities in DFAs and VPLs will be compensated using the same ratios and strategies as LUPA-BIO-COMP-1 through 4, with the exception identified below in DFA-VPL-BIO-COMP-2.	Mitigation Measure BIO-12, Desert Tortoise Compensatory Mitigation, requires 5:1 compensation for critical habitat and 1:1 compensation for every acre outside of critical habitat but inside project footprint. Mitigation Measure BIO-18, Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures, requires compensatory mitigation for impacts to 4 burrowing owls (estimated at 78 acres) Mitigation Measure BIO-19, Special-Status Plan Impact Avoidance, Minimization and Compensation, requires compensatory mitigation for special status plants (if required) at a 3:1 ratio for Rank 1 plants and a 2:1 ratio for Rank 2 plants Mitigation Measure BIO-20, Sand Dune/Mojave Fringe-Toed Lizard Mitigation, requires compensation for MFTL and dune habitat at 3:1 ratio for direct impacts to stabilized and partially stabilized sand dunes, 1:1 ratio for direct impacts to non-dune MFTL habitat, and a 0.5:1 ratio for indirect impacts to stabilized and partially stabilized sand dunes Mitigation Measure BIO-21, Mitigation for Impacts to State Waters, requires compensation of a parcel of land that includes state jurisdictional waters per the area of state waters directly or indirectly impacts by the project footprint at a 3:1 ratio	Mitigation Measures BIO-12, BIO-18, BIO-19, BIO-20, and BIO-21 require compensation at ratios similar to the DRECP. The Palen mitigation measures have a higher compensation ration than the DRECP for MFTL and dune habitat. The mitigation measures do not specifically address desert riparian woodland vegetation, but MM BIO-21 requires mitigation at 3:1 for state jurisdictional waters, which would include this habitat. **The MM requirements partially satisfy the resource management goals of the DRECP. The MM would require an additional 380 acres of compensation for the Proposed Action to full meet the management goals for the desert riparian woodland vegetation types.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
DFA-VPL-CTTM-1	Avoid Tier 1, Tier 2, Tier 3 roads/primitive roads/trails, Backcountry Byways, and other significant linear features (as defined in the LUPA-wide CMAs). If avoidance is not practicable, relocate access to the same or higher standard and maintain the recreation setting characteristics and access to recreation activities, facilities, and destination.	No specific mitigation addresses this CMA.	There are no Tier 1 or Tier 2 roads/primitive roads, Back Country Byways, or significant linear features that would be affected by the project. The only effects would be to Tier 3 routes. Effects to those routes would be considered under LUPA-CTTM-2. EDF is adopting this measure as APM-44 with minor modifications. **No MMs address this CMA, but EDF has adopted it as APM-44; therefore, the DRECP goals and objectives would be met by the Proposed Action.**
DFA-VPL-CTTM-2	If residual impacts to Tier 1 and Tier 2 roads/primitive roads/trails, Backcountry Byways, or other significant linear features cannot be protected and maintained, commensurate compensation in the form of an enhanced recreation operations, recreation facilities or opportunities will be required.	No specific mitigation addresses this CMA.	There are no Tier 1 or Tier 2 roads/primitive roads, Back Country Byways, or significant linear features that would be affected by the project, but EDF is adopting this measure as APM-45. **No MMs address this CMA, but EDF has adopted it as APM-45; therefore, the DRECP goals and objectives would be met by the Proposed Action..**
DFA-VPL-CUL-1	For transmission (and renewable energy) activities, require the applicant to pay all appropriate costs associated with analysis of the resources, sensitivity analysis, Section 106 process, and update to the cultural resources geodatabase.	The BLM has an existing cost recovery agreement with EDF for the Palen project. The geodatabase is not yet available; however, the cost-recovery agreement covers the other work the BLM is performing.	**The existing cost-recovery agreement covers the resource management goals of the DRECP.**
DFA-VPL-CUL-2	A compensatory mitigation fee will be required within the LUPA Decision Area to address cumulative and some indirect adverse effects to historic properties. The mitigation fee will be calculated in a manner that is commensurate to the size and regional impacts of the project.	Mitigation Measures CUL-1, Prehistoric Trails Network Cultural Landscape Documentation and NRHP Nomination, and CUL-2, Desert Training Center California-Arizona Maneuver Area Cultural Landscape require compensatory fees to be paid for the cumulative impact to these resources.	**The compensatory fees addressed in Mitigation Measure CUL-1 and CUL-2 may no longer be applicable due to updated information regarding the cultural resources in the site. Additionally, the DRECP compensatory mitigation fee has not yet been determined by the BLM. As the Section 106 process is ongoing, this type of a fee may be included in the current Palen project but will be determined during the Section 106 consultation process. The resource management goals of the DRECP will be addressed during the Section 106 process.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
DFA-VPL-CUL-3	For renewable energy activities and transmission, the management fee rate will be determined through the NHPA programmatic Section 106 consultation process that will be completed as part of the DRECP land use plan amendment.	Mitigation Measures CUL-1, Prehistoric Trails Network Cultural Landscape Documentation and NRHP Nomination, and CUL-2, Desert Training Center California-Arizona Maneuver Area Cultural Landscape require compensatory fees to be paid for the cumulative impact to these resources.	**The compensatory fees addressed in Mitigation Measure CUL-1 and CUL-2 may no longer be applicable due to updated information regarding the cultural resources in the site. Additionally, the DRECP compensatory mitigation fee has not yet been determined by the BLM. As the Section 106 process is ongoing, this type of a fee may be included in the current Palen project but will be determined during the Section 106 consultation process. The resource management goals of the DRECP will be addressed during the Section 106 process.**
DFA-VPL-CUL-4	For renewable energy activities and transmission, demonstrate that results of cultural resources sensitivity, based on the DRECP geodatabase, and other sources, are used as part of the initial planning pre-application process and to select of specific footprints for further consideration.	As part of the NEPA process, cultural resources surveys have already been completed along the entire length of the gen-tie alignment.	**The cultural resources survey already completed for the NEPA process covers the resource management goals of the DRECP.**
DFA-VPL-CUL-5	For renewable energy activities and transmission, provide a statistically significant sample survey as part of the pre-application process, unless the BLM determines the DRECP geodatabase and other sources are adequate to assess cultural resources sensitivity of specific footprints.	As part of the NEPA process, cultural resources surveys have already been completed along the entire length of the gen-tie alignment.	**The cultural resources survey already completed for the NEPA process covers the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
DFA-VPL-CUL-6	For renewable energy activities and transmission, provide justification in the application why the project considerations merit moving forward if the specific footprint lies within an area identified or forecast as sensitive for cultural resources by the BLM.	Mitigation Measure CUL-5, Cultural Resources Monitoring and Mitigation Plan, requires impact protocols for all known resources and must be approved by the BLM, CUL-7, Worker Environmental Awareness Program (WEAP), requires training workers regarding sensitive cultural resources, CUL-8, Construction Monitoring Program, requires monitoring to prevent impacts to undiscovered resources and ensure that known resources are not impacted in an unanticipated manner, CUL-9, Authority to Halt Construction: Treatment of Discoveries grants the authority to halt construction in the event that a cultural resource is found, CUL-10, Flag and Avoid, requires resources in the transmission line to be flagged and avoided when they can be spanned rather than impacted.	Mitigation measures will require reducing impacts of the gen-tie to cultural resources to the extent feasible including spanning the resources when feasible. **The MM requirements will satisfy the resource management goals of the DRECP.**
DFA-VPL-CUL-7	For renewable energy activities and transmission, complete the NHPA Section 106 Process as specified in 36 CFR Part 800, or via an alternate procedure, allowed for under 36 CFR Part 800.14 prior to issuing a ROD or ROW grant on any utility-scale renewable energy or transmission project.	The Palen Project is in the process of completing the Section 106 process.	**The Palen project is in the process of completing the Section 106 process as required under the management goals of the DRECP.**
DFA-VPL-VRM-1	Encourage development in a planned fashion within DFAs to avoid industrial sprawl.	The Palen Solar Project site was selected prior to the establishment of the DFAs but is in proximity to the Genesis Solar Energy Project, thereby avoiding sprawl. Additionally, cumulative projects would also fill in the DFA in the Desert Center Area, clustering the development.	**The location of the Palen project is in proximity to other renewable development so would satisfy the management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
DFA-VPL-VRM-2	Development in DFAs and VPLs are required to incorporate visual design standards and include the best available, most recent BMPs, as determined by BLM.	VIS-4, Project Design, requires the project owner, to the extent possible, to use proper design fundamentals to reduce the visual contrast to the characteristic landscape. These include proper siting and location; reduction of visibility; repetition of form, line, color, and texture of the landscape; and reduction of unnecessary disturbance.	Mitigation Measure VIS-4 12 requires best management practices that apply and meet the recommendations given in DFA-VPL-VRM-2. EDF is adopting this measure as APM-46 with modifications. **The MMs requirements satisfy the resource management goals of the DRECP.**
DFA-VPL-VRM-3	All development within the DFAs and VPLs will abide by the BMPs addressed in the most recent version of the document "Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands," or its replacement. BMPs for solar projects from the document include: ▪ Develop a glint and glare assessment and mitigation plan ▪ Avoid offsite glare ▪ Use color-treated collectors and support structures ▪ Avoid complete removal of vegetation beneath collector array	Mitigation Measure VIS-1, Surface Treatment of Project Structures and Buildings, requires treating the surfaces of all project structures and buildings visible to the public such that a) their colors minimize visual intrusion and contrast by blending with/matching the existing characteristic landscape colors; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with local policies and ordinances. VIS-4, Project Design, requires the project owner, to the extent possible, to use proper design fundamentals to reduce the visual contrast to the characteristic landscape. TRANS-6, Glint and Glare Reduction Measures, requires the project to implement measures during operations to reduce glint and glare.	Mitigation measures VIS-1 and VIS-4 and TRANS-6 detail methods that meet recommendations given in the "Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands". EDF is adopting this measure as APM-47 with modifications. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
Development Focus Areas			
DFA-BIO-IFS-1	Conduct the following surveys as applicable in the DFAs: ▪ Desert Tortoise: Protocol surveys in the desert tortoise habitat areas ▪ FTHL: Protocol surveys as specified in the Rangewide Management Strategy ▪ Bendire's Thrasher: Pre-construction nesting bird survey during breeding season (March 1 through September 30) in suitable habitat on and within 500 feet of construction zone ▪ Burrowing Owl: Breeding season surveys (February 1 through August 31) per Burrowing Owl Guidelines (CDFG 2012). Clearance surveys (for direct take avoidance) no less than 14 days prior to ground disturbance per Burrowing Owl Guidelines ▪ California condor: None ▪ Gila woodpecker: None ▪ Golden eagle: Pre-project golden eagle surveys and pre-construction risk assessment surveys in LUPA-BIO-IFS-28, if applicable as described in golden eagle CMAs below ▪ Swainson's hawk: Protocol surveys in the Antelope and Owens Valleys ▪ Desert bighorn sheep: None ▪ MGS: Clearance surveys in the Mohave ground squirrel habitat areas indicated in Appendix D. Protocol surveys in key population centers and linkages as identified on the map in Appendix D.	Protocol level surveys have already been conducted for desert tortoise, avian species, and golden eagles. The Palen site is outside the range of FTHL, California condor, Gila woodpecker, desert bighorn sheep, and MGS. BIO-15, Pre-construction Nest Surveys and Avoidance Measures requires nesting surveys to identify general locations of nests and establish a protective buffer zone. BIO-18, Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures, requires a Burrowing Owl Mitigation Plan that would be approved by the BLM in consultation with USFWS and CDFW that includes detailed methods and guidance for passive relocation of burrowing owls, including monitoring and management of the effort. Mitigation Measure BIO-25, Golden Eagle Inventory and Monitoring, requires golden eagle inventory during construction to determine if golden eagle territories occur within one mile of the project boundaries. If an occupied nest is detected within one mile of Project boundaries, the project will prepare and implement a Golden Eagle Monitoring and Adaptive Management Plan.	The Palen project has already completed surveys of the project site and Mitigation Measures require pre-construction nesting surveys during appropriate seasons for avian species and burrowing owls. **The surveys performed for the Palen project and the MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
DFA-BIO-IFS-2	Implement the following setbacks as applicable: ▪ Desert tortoise: None ▪ FTHL: None ▪ Bendire's thrasher: Setback pre-construction, construction, and decommissioning, and other activities 500 feet from active nests ▪ Burrowing owl: 656 feet (200 meters) from active nesting sites. ▪ California condor: Setback wind and transmission projects 5 miles from nest sites Setback solar, geothermal, and other activities than may impact condors 1.5 miles from nest sites and out of direct line of site from nest sites ▪ Gila woodpecker: Setback pre-construction, construction, and decommissioning, and other activities that may impact the species 0.25 mile from suitable habitat during the breeding season (April 1 through July 31). ▪ Golden eagle: Setback activities 1 mile from active or alternative nests within an active territory as described in LUPA-BIO-IFS-24. ▪ Swainson's hawk: 0.5 mile from active nests ▪ Desert bighorn sheep: None ▪ MGS: None	The Palen site is outside the California condor range, does not include typical nesting habitat for Gila woodpecker, and does not have Swainson's hawk nesting habitat. BIO-15, Pre-construction Nest Surveys and Avoidance Measures requires nesting surveys to identify general locations of nests and establish a protective buffer zone. BIO-18, Burrowing Owl Impact Avoidance, Minimization, and Compensation Measures, requires a Burrowing Owl Mitigation Plan that would be approved by the BLM in consultation with USFWS and CDFW that includes detailed methods and guidance for passive relocation of burrowing owls, including monitoring and management of the effort. The buffer established in the mitigation measure is 250 feet but this buffer would need to be approved by the BLM in consultation with the USFWS and CDFW so may be updated. Monitoring of any construction activities within 500 feet of a burrow would be required Mitigation Measure BIO-25, Golden Eagle Inventory and Monitoring, requires golden eagle inventory during construction to determine if golden eagle territories occur within one mile of the project boundaries. If an occupied nest is detected within one mile of Project boundaries, the project will prepare and implement a Golden Eagle Monitoring and Adaptive Management Plan.	Mitigation Measure BIO-15 requires pre-construction nesting surveys and protective buffer zones. BIO-18 requires avoiding impacts to burrowing owls including buffers around any occupied burrows. While the buffer is less than the setback required by the DRECP, the avoidance plan will be approved by the BLM, in consultation with the USFWS and CDFW, so could update the buffer to the most recent setback recommendations. **The MM requirements satisfy the resource management goals of the DRECP but may be updated to reflect the most recent guidelines.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
DFA-BIO-IFS-3: Desert tortoise	Protocol surveys, as described in **DFA-BIO-IFS-1** and shown in Table 21, are required for development in the desert tortoise survey areas (see Appendix D). Based on the results of the protocol surveys the identified desert tortoises will be translocated, or the activity will be redesigned/relocated: ▪ If protocol surveys identify 35 or fewer desert tortoises in potential impact areas on an activity site, the USFWS and CDFW (for third party activities) will be contacted and provided with the protocol survey results and information necessary for the translocation of identified desert tortoises. Pre-construction and construction, and other activities will not begin until the clearance surveys for the site have been completed and the desert tortoises have been translocated. Translocation will be conducted in coordination with the USFWS and CDFW, as appropriate, per the protocols in the Desert Tortoise Field Manual (USFWS 2009) and the most up-to-date USFWS protocol. ▪ If protocol surveys identify an adult desert tortoise density (i.e., individuals 160 millimeters or more) of more than 5 per square mile or more than 35 individuals total on a project site, the project will be required to be redesigned, re-sited, or relocated to avoid and minimize the impacts of the activity on desert tortoise	Protocol level desert tortoise surveys have been completed on the site in 2009, 2010, and 2016. No desert tortoise was found and minimal desert tortoise sign was found. Mitigation Measure BIO-9, Desert Tortoise Protection, requires desert tortoise exclusion fencing using the USFWS 2009 Desert Tortoise Field Manual. The measure allows this to occur during any season with CDFW and USFWS approval. The fencing is required for any areas of disturbance, permanent or temporary and requires security gates to be designed to avoid impacts to desert tortoise. The fence must be inspected regularly. BIO-10, Desert Tortoise Relocation/Translocation Plan requires the applicant to develop a plan that is consistent with the current USFWS regulations and that is approved by the BLM for the desert tortoise relocation. Mitigation Measure BIO-11, Desert Tortoise Compliance Verification, specifies the verification required to make sure the project is minimizing impacts to desert tortoise.	Mitigation Measures BIO-9, BIO-10, and BIO-11 specify that the project applicant must include desert tortoise fencing, prepare a relocation/translocation plan, and provide compliance verification. Desert tortoise surveys did not find any live tortoise and minimal tortoise sign. The project is not expected to impact more than 35 tortoises and it is unlikely that it would be required to be redesigned or relocated. **The MMs requirements satisfy the resource management goals of the DRECP.**

Table 1. DRECP Conservation and Management Action and PSPP Mitigation Measure Crosswalk

DRECP CMA	CMA Summary	PSPP Mitigation Measure	Conclusion
DFA-REC-7	If designated vehicle routes are directly impacted by activities, mitigation will include the development of alternative routes to allow for continued vehicular access with proper signage and a similar recreation experience and the construction of an "OHV touring route" if determined to be appropriate by BLM.	No specific mitigation addresses this CMA.	The project area has 14 miles of trails that would be closed; however, other routes/washes could be used to access the same recreation areas so it is unclear if the routes would need to be relocated. EDF is adopting this measure as APM-48. **No MMs address this CMA, but EDF has adopted it as APM-48; therefore, the DRECP goals and objectives would be met by the Proposed Action.**
DFA-VRM-1	Manage all DFAs as VRM Class IV to allow for industrial scale development. Employ best management practices to reduce visual contrast of facilities.		Under the DRECP LUPA, the Palen site VRM would be Class IV which allows for a high level of change. However, because the Palen project is not subject to the DRECP, it will be considered under the previous classification of VRM Class III objective, which allows for a moderate level of change to the characteristic landscape while partially retaining the existing character of the landscape and any changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. Mitigation measures VIS-1 and VIS-4 detail methods that meet recommendations given in LUPA-VRM-1. **The MMs requirements satisfy the resource management goals of the DRECP.**
DFA-VRM-2	Regional mitigation for visual impacts is required in DFAs. The following mitigation ratios will be applied in DFAs: ▪ VRI Class II - 1:1 ratio ▪ VRI Class III - 0.5:1 ratio ▪ VRI Class IV, no mitigation required. Additional mitigation will be required where activities affect viewsheds of specially designated areas.	The Palen site was given a VRI Class III in the Solar PEIS which would require a 0.5:1 ration for mitigation. No specific mitigation addresses this CMA.	**Because no mitigation addresses this CMA, the DRECP resource management goal would not be met by the Proposed Action.**

2. CMAs Not Applicable to the Palen Solar Project

Table 2 lists Conservation and Management Actions from the DRECP LUPA that are not applicable to the Palen Solar Project.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
LUPA-Wide CMAs		
Biological Resources		
LUPA-BIO-RIPWET-2: Maintain hydrologic function	This CMA requires the activities to maintain the hydrologic function of North American Warm Desert Alkaline Scrub and Herb Playa and Wet Flat, Southwestern North American Salt Basin and High Marsh, and other undifferentiated wetland-related land covers (i.e., "Playa," "Wetland," and "Open Water")	None of these vegetation types are present on the Palen Solar Site
LUPA-BIO-RIPWET-3: BLM Special-Status Riparian Bird Species	Activities within 0.25 miles of a riparian or wetland vegetation types that may impact BLM Special-Status riparian and wetland bird species, conduct pre-construction/activity nesting. Setbacks may be required from active nests during breeding season.	None of these vegetation types are present on the Palen Solar Site
LUPA-BIO-RIPWET-4: Federally Listed Fish Species	Setback pre-construction, construction, and decommissioning activities, and other activities that may impact federally-listed fish species, 0.25 mile from the edge of existing or newly discovered occurrences of federally-listed fish species.	There are no fish species in the project area.
LUPA-BIO-RIPWET-5: New fish species	Site and design activities to fully avoid operational impacts to existing and newly discovered occurrences of federally listed fish species	There are no fish species in the project area.
LUPA-BIO-RIPWET-6: Tehachapi Slender Salamander	Avoid pre-construction, construction, and decommissioning activities or other activities that may impact the Tehachapi slender salamander within 0.25 mile of existing or newly discovered occurrences of or suitable habitat for Tehachapi slender salamander	There are no Tehachapi slender salamander in the project area.
LUPA-BIO-RIPWET-7:	Construct culverts or other suitable below-grade crossings for new or improved roadways that bisect suitable habitat for the Tehachapi Slender Salamander	There are no Tehachapi slender salamander in the project area.
LUPA-BIO-BAT-1:	Activities, except wind projects, will not be sited within 500 feet of any occupied maternity roost or presumed occupied maternity roost as described below.	No active bat roosts were documented on the Palen site and no bats are expected to have a substantial roost on the project site because the habitat features associated with the species do not occur onsite.
LUPA-BIO-BAT-2:	Mines will be assumed to be occupied bat roosts, unless appropriate surveys for bat use have been conducted during all seasons (including maternity, lekking or swarming, and winter use).	There are no mines on the project site or within 500 feet.
LUPA-BIO-PLANT-1: Protocol surveys	Conduct properly timed protocol surveys in accordance with the BLM's most current (at time of activity) survey protocols for plant Focus and BLM Special Status Species.	Protocol surveys were already performed for the Palen Solar Project and no Focus or BLM Special-Status Species were found onsite.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
LUPA-BIO-PLAN T-2: Avoidance setbacks	Implement an avoidance setback of 0.25 mile for all Focus and BLM Special Status Species occurrences.	Protocol surveys were already performed for the Palen Solar Project and no Focus or BLM Special-Status Species were found onsite.
LUPA-BIO-SVF-2:	Yucca clones larger than 3 meters in diameter (longest diameter if the clone forms an ellipse rather than a circular ring) shall be avoided.	Protocol surveys were already performed for the Palen Solar Project and no yucca clones were found onsite.
LUPA-BIO-SVF-4:	Saguaro cactus should be managed in such a way as to provide long- term habitat for the California populations not just individual plants, except in DFAs.	Protocol surveys were already performed for the Palen Solar Project and no saguaro cactus were found onsite.
LUPA-BIO-SVF-5:	Joshua tree woodland (Yucca brevifolia Woodland Alliance): impacts to Joshua Tree woodlands (*see* Glossary of Terms) will be avoided to the maximum extent practicable	Protocol surveys were already performed for the Palen Solar Project and no Joshua tree woodlands were found onsite.
LUPA-BIO-SVF-7:	Crucifixion thorn stands: (Castela emoryi Shrubland Special Stands) Crucifixion thorn stands with greater than 100 individuals will be avoided.	Protocol surveys were already performed for the Palen Solar Project and no crucifixion thorn stands were found onsite.
LUPA-BIO-VEG-4	Within the Bishop Field Office area, provide yearlong protection of endangered, threatened, candidate, and sensitive plant and animal habitats. Yearlong protection means that no discretionary actions which would adversely affect target resources will be allowed	The Palen project is not within the Bishop Field Office area.
LUPA-BIO-IFS-1:	Activities within desert tortoise linkages that may impact the linkages will require evaluation in the environmental document to identify the impacts to long-term viable desert tortoise populations. Activities that would compromise the long-term viability of the linkage population of the function of the linkage are prohibited.	The Palen project is not within a desert tortoise linkage identified in Appendix D of the DRECP LUPA.
LUPA-BIO-IFS-2	Construction of new roads or routes in desert tortoise conservation areas or tortoise linkages will be avoided to the maximum extent practical. Any new roads will not be paved and will be designed to minimize effects to desert tortoise populations.	The Palen project is not within a desert tortoise linkage or tortoise conservation area identified in Appendix D of the DRECP LUPA.
LUPA-BIO-IFS-10	Comply with the conservation goals and objectives, criteria, and management planning actions identified in the most recent revision of the Flat-tailed Horned Lizard Rangewide Management Strategy.	The Palen project is not within FTHL range.
LUPA-BIO-IFS-14	Activity-specific active translocation of burrowing owls may be considered, in coordination with CDFW	The Palen project does not include or provide a mitigation measure for active translocation of burrowing owls. If burrowing owls are present on the site, MM BIO-18 may include passive relocation in conformance with CDFW Guidelines.
LUPA-BIO-IFS-15	All activities will be designed and sited in a manner to avoid or minimize the likelihood of contact, injury, and mortality of California condors	The Palen project is not within California condor range or habitat
LUPA-BIO-IFS-16	Flight activity related to any activities will not be allowed in the airspace extending to 3,000 feet above condor nest sites	The Palen project is not within California condor range or habitat

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
LUPA-BIO-IFS-17	In the range of the California condor, structures supported by guy wires will be marked with recommended bird deterrent devices	The Palen project is not within California condor range or habitat
LUPA-BIO-IFS-18	In the range of the California condor, all equipment and work-related materials that are potentially hazardous to condors will be kept in closed containers when not being used	The Palen project is not within California condor range or habitat
LUPA-BIO-IFS-19	In the range of the California condor, when feasible, ethylene glycol-based anti-freeze or other ethylene glycol-based liquid substances will be avoided	The Palen project is not within California condor range or habitat
LUPA-BIO-IFS-20	Activities that are determined to have a potential risk of taking condors will implement the best detect, deter, and curtailment strategy available at the time of the activity to minimize adverse effects	The Palen project is not within California condor range or habitat
LUPA-BIO-IFS-21	If condors begin to regularly visit a site, BLM may require, in coordination with USFWS, and CDFW as appropriate, the implementation of additional measures to minimize potential impacts to condors	The Palen project is not within California condor range or habitat
LUPA-BIO-IFS-22	Operations and/or activities that reach an activity-specified trigger for condor injury and/or mortality as determined by BLM and USFWS, and CDFW as appropriate, will curtail operations and/or activities using best available techniques	The Palen project is not within California condor range or habitat
LUPA-BIO-IFS-23	In the range of the California condor, if an activity may have an impact on California condors, a Condor Operations Strategy (COS) will be developed and implemented on an activity-specific basis in order to avoid and/or reduce the likelihood of injury and mortality from activities	The Palen project is not within California condor range or habitat
LUPA-BIO-IFS-25	Cumulative loss of golden eagle foraging habitat within a 1 to 4 mile radius around active or alternative golden eagle nests will be limited to less than 20%.	No active golden eagle nest sites have been documented within 4 miles of the Palen site during surveys in 2010, 2012, or 2013. The only suitable nesting habitat within 4 miles is in the Palen Mountains, between 3 to 4 miles from the site.
LUPA-BIO-IFS-27	If a permit for golden eagle take is determined to be necessary, an application will be submitted to the USFWS in order to pursue a take permit	The Palen project is unlikely to require a golden eagle take permit.
LUPA-BIO-IFS-29	For active nests with recreational conflicts that risk the occurrence of take, provide public notification (e.g., signs) of the sensitive area and implement seasonal closures as appropriate	The Palen project is not in an active nest area and does not have recreational conflicts.
LUPA-BIO-IFS-30	For activities where ongoing take of golden eagles is anticipated, develop advanced conservation practices per USFWS Eagle Conservation Plan Guidance	Ongoing take of golden eagles is not anticipated at the Palen project
LUPA-BIO-IFS-31	For activities/projects that are likely to impact golden eagles implement site-specific golden eagle mortality monitoring in support of the pre-construction, pre-activity risk assessment surveys	The Palen project is not likely to impact golden eagles.
LUPA-BIO-IFS-32	Avoid use of rodenticides and insecticides within five miles of active Swainson's hawk nest	The Palen site is outside geographic range (except during migration)

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
LUPA-BIO-IFS-33	Access to, and use of, designated water sources for desert bighorn sheep will not be impeded by activities in designated and new utility corridors	The Palen site is outside utility corridor; Palen gen-tie would not impede bighorn sheep access; and no water sources are located onsite
LUPA-BIO-IFS-34	Transmission projects and new utility corridors will minimize effects on access to, and use of, designated water sources for desert bighorn sheep	The Palen site is outside utility corridor; the Palen gen-tie would not impede bighorn sheep access; and no water sources are located onsite.
LUPA-BIO-IFS-35	Protocol surveys are required for activities in Mohave ground squirrel key population centers and linkages	The Palen site is outside Mohave ground squirrel range
LUPA-BIO-IFS-36	Activities in Mohave ground squirrel key population centers requiring an Environmental Impact Statement are required to assess the effect of the activity on the long term function of the affected key population center	The Palen site is outside Mohave ground squirrel range
LUPA-BIO-IFS-37	Activities in key population centers will be sited in previously disturbed areas, areas of low habitat quality and in areas with low habitat intactness, to the maximum extent practicable	The Palen site is outside Mohave ground squirrel range
LUPA-BIO-IFS-38	Disturbance of suitable habitat from activities, requiring an EA or EIS, within the Mohave ground squirrel key population centers and linkages will not occur during the typical dormant season	The Palen site is outside Mohave ground squirrel range
LUPA-BIO-IFS-39	During the typical active Mohave ground squirrel season (February 1 through August 31), conduct clearance surveys throughout the site, immediately prior to initial ground disturbance	The Palen site is outside Mohave ground squirrel range
LUPA-BIO-IFS-40	Activities sited in a Mohave ground squirrel linkage that may impact the linkage are required to analyze the potential effects on connectivity through the linkage	The Palen site is outside Mohave ground squirrel range
LUPA-BIO-IFS-41	For any ground-disturbing activities, occurrences of Mohave ground squirrel will be flagged and avoided, with a minimum avoidance area of 50 feet	The Palen site is outside Mohave ground squirrel range
LUPA-BIO-IFS-42	Rodenticides will not be used to manage rodents on activity within the range of the Mohave ground squirrel	The Palen site is outside Mohave ground squirrel range
Comprehensive Trails and Travel Management		
LUPA-CTTM-1	Maintain and manage adequate Road, Primitive Road, and Trail Access to and within SRMAs, ERMAs, OHV Open Areas, and Level 1, 2, and 3 Recreation Facilities.	There are no SRMAs; ERMAs; OHV Open Areas; or Level 1, 2, and 3 Recreation Facilities within the project area, as it is located in a Designated Focus Area (DFA), nor are there roads from the project area to these sites besides via the Interstate-10.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
LUPA-CTTM-3	Manage other significant linear features such as Mojave Road, Bradshaw Trail, or other recognized linear features to protect their important recreation activities, experiences and benefits. Prohibit activities that have a significant adverse impact on use and enjoyment within 0.5 mile (from centerline) of such linear features.	There are no significant linear features that are within 0.5 mile of the project. The nearest linear feature, the Bradshaw Trail, is about 17 miles south of the project area. The project would not be visible from the Trail and, therefore, would not adversely impact the use and enjoyment of the trail.
LUPA-CTTM-4	If residual impacts to Tier 1 and Tier 2 roads/primitive roads, Back Country Byways, or significant linear features occur from adjacent DFAs or other activities, commensurate compensation in the form of enhanced recreation operations, access, recreation facilities or opportunities will be required.	There are no Tier 1 or Tier 2 roads/primitive roads, Back Country Byways, or significant linear features that would be affected by the project. The only effects would be to Tier 3 routes. Effects to those routes would be considered under LUPA-CTTM-2.
LUPA-CTTM-6	Manage Back Country Byways as a component of BLM Recreation and Travel and Transportation Management program.	There are no Back Country Byways within the project area. The nearest Back Country Byway, the Bradshaw Trail, is about 17 miles south of the project area.
LUPA-CTTM-7	Manage Recreation Facilities consistent with the objectives for the recreation management areas and facilities.	There are no Recreation Facilities within, or near, the project area.
Cultural Resources and Tribal Interests		
LUPA-CUL-1	Continue working with the California Office of Historic Preservation (OHP) to develop and implement a program for record keeping and tracking agency actions that meets the needs of BLM and OHP organizations pursuant to existing State and National agreements and regulation (BLM State Protocol Agreement; BLM National Programmatic Agreement).	Record keeping and tracking are agency functions, therefore this CMA does not pertain to this specific project
LUPA-CUL-6	Develop partnerships to assist in the training of groups and individuals to participate in site stewardship programs.	No public access will be allowed to the Palen site but EDF is planning to adopt as APM-23.
LUPA-CUL-7	Coordinate with visual resources staff to ensure VRM Classes consider cultural resources and tribal consultation to include landmarks of cultural significance to Native Americans (TCPs, trails, etc.).	The Palen site is in a DFA. The DRECP established the VRM Class for the DFAs already.
LUPA-CUL-8	Conduct regular contact and consultation with federally recognized Tribes and individuals, consistent with statute, regulation and policy.	This is an agency requirement so would be fulfilled by BLM. EDF has done outreach to the Tribes but this is not required by statute, regulation, or policy.
LUPA-CUL-10	Promote and protect desert fan palm oasis vegetation type/communities by avoiding where possible, then use required compensatory mitigation, off-site mitigation, and other means to ensure Native American cultural values are maintained.	There is no desert fan palm oasis vegetation in the Palen site.
Lands and Realty		
LUPA-LANDS-1	Identify acquired lands as right-of-way exclusion areas when development is incompatible with the purpose of the acquisition.	The Palen project is not located on acquired lands.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
LUPA-LANDS-2	Prioritize acquisition of land within and adjacent to conservation designation allocations.	The Palen project would not acquire lands except for mitigation. Mitigation lands would need to conform to the resource needs and then could consider other priorities. Mitigation lands would need to be approved by the BLM regardless.
LUPA-LANDS-3	Within land use allocations where renewable energy and ancillary facilities are not allowed, an exception exists for geothermal development.	The project facility will use solar PV technology and is located in a DFA.
LUPA-LANDS-4	Nonfederal lands within the boundaries of BLM LUPA land use allocations are not affected by the LUPA.	The Palen site is on federal land designated as a DFA.
LUPA-LANDS-6	Any activities on Catellus Agreement lands will be consistent with deed restrictions.	The Palen site is not located on Catellus Agreement lands.
LUPA-LANDS-7	Any activities on Catellus Agreement lands will be subject to the approval of the California State Director.	The Palen site is not located on Catellus Agreement lands.
LUPA-LANDS-9	Continue land exchanges with the State of California, as per the LUPA goals and objectives in Section II.4.1.4. Refer to Appendix F.	No land exchanges would be made for the project.
LUPA-LANDS-10	Enter into land exchanges with the California State Lands Commission (CSLC) which convey BLM lands suitable for, or developed as, large-scale renewable energy related projects in exchange for CSLC school lands located in and adjacent to designated conservation areas.	No land exchanges would be made for the project.
LUPA-LANDS-11	Prioritize land exchange proposals from the CSLC on available lands if there are competing land tenure proposals.	No land exchange proposals would be made for the project.
Livestock Grazing		
LUPA-LIVE-1	Adopt the Standards of Rangeland Health and Guidelines for Grazing Management, as detailed below, for the CDCA.	The Palen project is not located in a grazing allotment.
LUPA-LIVE-2	In the CDCA only, accept grazing permit/lease donations in accordance with legislation in the Fiscal Year 2012 Appropriations ACT.	The Palen project is not located in an area open to grazing.
LUPA-LIVE-3	In the Bishop and Bakersfield RMPs, determine whether continued livestock grazing would be compatible with achieving land use plan management goals and objectives in the event that the permit/lease is relinquished.	The Palen project is not located in the Bishop or Bakersfield RMP areas.
LUPA-LIVE-4	If the BLM determines that the grazing allotment is to be put to a different public purpose than grazing, follow the notification requirements outline in the Grazing Regulations and BLM Instruction Memorandum, or future policy replacing the Memorandum.	The Palen project is not located in a grazing allotment.
LUPA-LIVE-5	For grazing allotments within the CDCA that BLM has received a voluntary request for relinquishment prior to fiscal year 2012, continue the planning process for making these allotments unavailable for grazing.	The Palen project is not located in a grazing allotment.
LUPA-LIVE-6	Complete the process for approving rangeland health standards and guidelines for the CDCA Plan (NEMO, WEMO, NECO, and PSSCRMP).	The Palen project is not located in a grazing allotment.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
LUPA-LIVE-7	Make Pilot Knob, Valley View, Cady Mountain, Cronese Lake, and Harper Lake allotments, allocations unavailable for livestock grazing and change to management for wildlife conservation and ecosystem function. Reallocate the forage previously allocated to grazing use in these allotments to wildlife and ecosystem functions.	The Palen project is not located in a grazing allotment.
LUPA-LIVE-8	The following vacant grazing allotments within the CDCA will have all vegetation previously allocated to grazing use reallocated to wildlife use and ecosystem functions and will be closed and unavailable to future livestock grazing: Buckhorn Canyon, Crescent Peak, Double Mountain, Jean Lake, Johnson Valley, Kessler Springs, Oak Creek, Chemehuevi Valley, and Piute Valley.	The Palen project is not located in a grazing allotment.
LUPA-LIVE-9	Allocate the forage that was allocated to livestock use in the Lava Mountain and Walker Pass Desert allotments (which have already been relinquished under the 2012 Appropriations Act) to wildlife use and ecosystem function and permanently eliminate livestock grazing on the allotments.	The Palen project is not located in a grazing allotment.
Minerals		
LUPA-MIN-1	Mineral resource - High Potential Mineral Areas (identified in CA GEM data): These areas have been identified as mineral lands having existing and/or historic mining activity and a reasonable probability of future mineral resource development. If an activity is proposed in a High Potential Mineral Area, analyze and consider the mineral resource value in the NEPA analysis.	The Palen site is not in an area identified as a High Potential Mineral Area.
LUPA-MIN-2	Mineral resource - Existing Mineral/Energy Operations: Existing authorized mineral/energy operations, including existing authorizations, modifications, extensions and amendments and their required terms and conditions, are designated as an allowable use within all BLM lands in the LUPA Decision Area, and unpatented mining claims subject to valid existing rights.	The Palen site is not in an area with existing minerals or energy operations.
LUPA-MIN-3	Mineral resource - Existing High Priority Mineral/Energy Operations Exclusion Areas: Existing high-priority operation footprints and their identified expansion areas are excluded from DFA and conservation CMAs, but must comply with LUPA-wide CMAs subject to the governing laws and regulations.	The Palen site is not in an Existing High Priority Mineral area.
LUPA-MIN-4	Established designated, approved, or authorized access routes to existing authorized operations and areas will be designated as allowable uses.	The Palen site is not in an area where there are identified mineral resources.
LUPA-MIN-5	Areas which could not be characterized as mineral areas due to insufficient data and mineral potential may fluctuate and require periodic updating.	The Palen site is not in an area where there are identified mineral resources.
National Recreation Trails		
LUPA-NRT-1	The Nadeau Road NRT was designated by the Secretary of the Interior in June 2013. The California Desert District nominates the Sperry Wash Road, El Mirage Interpretive Trail East, and El Mirage Interpretive Trail West for NRT designation.	The Palen site is not located near the Nadeau Road NRT, Sperry Wash Road, El Mirage Interpretive Trail East, or El Mirage Interpretive Trail West.
LUPA-NRT-2	The Nadeau NRT Management Corridor will be protected and activities impacting use and enjoyment of the trail will be avoided within 0.5 mile from centerline of the route.	The Palen site is not located near the Nadeau NRT Management Corridor.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
Recreation and Visitor Services		
LUPA-REC-1	Maintain, and where possible enhance, the recreation setting characteristics.	The Palen site is surrounded by recreational opportunities but is also surrounded by built environment, including two existing renewable energy projects. The project would be located in a DFA and the site does not experience high levels of recreation. It would not maintain or enhance the setting but would be consistent with some of the existing setting and with the DFA designation.
LUPA-REC-2	Cooperate with the network of communities and recreation service providers active within the planning area to protect the principal recreation activities and opportunities, and the associated conditions for quality recreation, by enhancing appropriate visitor services, and by identifying and mitigating impacts from development, inconsistent land uses, and unsustainable recreation practices.	The Palen project will not directly impact recreation service providers within the DFA or result in unsustainable recreation practices. The BLM is coordinating with the National Park Service in regard to indirect effects to Joshua Tree.
LUPA-REC-3	Manage lands not designated as SRMAs or ERMAs to meet recreation and visitor services and resource stewardship needs as described in Resource Management Plans (RMPs).	The RMP for this area is amended by the DRECP LUPA such that this area would be designated a DFA and appropriate for renewable energy development.
LUPA-REC-4	Prohibit activities that have a significant adverse impact and that do not enhance conservation or recreation values within one mile of Level 1 and Level 2 Recreation facility footprint.	There are no Level 1 or Level 2 recreation areas within one mile. Corn Spring Road is within 1 mile from the Palen site, but Corn Springs Campground is 10 miles from Interstate-10.
LUPA-REC-5	Avoid activities that have a significant adverse impact and that do not enhance conservation or recreation values within one-half mile of Level 3 Recreation facility footprint. If avoidance is not practicable, the facility must be relocated to the same or higher recreation standard and maintain recreation objectives and setting characteristics.	The nearest Level 3 facility is the kiosk at Corn Springs Road which is outside the ½-mile buffer established in LUPA-REC-5.
LUPA-REC-6	Limit signage to that necessary for recreation facility/area identification, interpretation, education, and safety/regulatory enforcement.	The Palen project will not include signage other than project name.
LUPA-REC-7	Refer to local RMPs, RMP amendments, and activity level planning for specially designated areas for Vehicular Stopping, Parking, and Camping limitations.	The Palen project will not include vehicular stopping, parking, or camping. The project site is located within a DFA.
LUPA-REC-8	Provide on-going maintenance of recreation and conservation facilities, interpretive and regulatory signs, roads, and trails.	The Palen project site would not be located within or near recreation and conservation facilities.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
Soil and Water General		
LUPA-SW-3	Where a seeming conflict between CMAs within or between resources arises, the CMA(s) resulting in the most resource protection apply.	No answer required.
LUPA-SW-4	Nothing in the "Exceptions" below applies to or takes precedence over any of the CMAs for biological resources.	No answer required.
LUPA-SW-9	The extent of desert pavement within the proposed boundary of an activity shall be mapped if it is anticipated that the activity may create erosional or ecologic impacts. Disturbance of desert pavement within the boundary of an activity shall be limited to the extent possible. If disturbance from an activity is likely to exceed 10% of the desert pavement mapped within the activity boundary, the BLM will determine whether the erosional and ecologic impacts of exceeding the 10% cap by the proposed amount would be insignificant and/or whether the activity should be redesigned to minimize desert pavement disturbance	There is no desert pavement on the Palen site.
LUPA-SW-12	Except in DFAs, exclude long-term structures in, playas (dry lake beds), and Wild and Scenic River corridors, except as allowed with minor incursions	The Palen site is located within a DFA and would not place structures on a playa or Wild and Scenic River corridor.
LUPA-SW-13	BLM will manage all riparian areas to be maintained at, or brought to, proper functioning condition.	This CMA is directed at the BLM.
LUPA-SW-28	Groundwater extractions from adjudicated basins, such as the Mojave River Basin, may be subject to additional restrictions imposed by the designated authority.	The Palen project is not within an adjudicated basin.
LUPA-SW-29	Groundwater pumping mitigation may also be imposed if monitoring data indicate impacts on groundwater or groundwater-dependent habitats outside the DRECP area, including those across the border in Nevada.	The project will have no impact on groundwater outside of the DRECP area.
LUPA-SW-33	Stipulations for groundwater development in the proximity of Devils Hole	The Palen project is not in proximity of Devils Hole
LUPA-SW-34	Stipulations for groundwater development in the Calvada Springs/South Pahrump Valley area	The Palen project is not in the Calvada Springs/Couth Pahrump Valley area
Wilderness Characteristics		
LUPA-WC-1	Complete an inventory of areas for proposed activities that may impact wilderness characteristics if an updated wilderness characteristics inventory is not available.	There are no lands with wilderness characteristics in the Palen site.
LUPA-WC-2	Employ avoidance measures as described under DFAs and approved transmission corridors.	There are no lands with wilderness characteristics in the Palen site.
LUPA-WC-3	For inventoried lands found to have wilderness characteristics, but are not managed for those characteristics, compensatory mitigation is required if wilderness characteristics are directly impacted.	There are no lands with wilderness characteristics in the Palen site.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
LUPA-WC-4	For areas identified to be managed to protect wilderness characteristics, identified in Figure 7, the following CMAs are required: ▪ Include a no surface occupancy stipulation for any leasable minerals with no exceptions, waivers, or modifications. ▪ Exclude these areas from land use authorizations, including transmission. ▪ Close areas to construction of new roads and routes. Vehicles will continue to be permitted on existing designated routes. ▪ Close areas to mineral material sales. ▪ Prohibit commercial or personal-use permits for extraction of materials. ▪ Manage the area as VRM II. ▪ Require that new structures and facilities are related to the protection or enhancement of wilderness characteristics or are necessary for the management of uses allowed under the land use plan. Make lands unavailable for disposal from federal ownership.	There are no lands with wilderness characteristics in the Palen site.
LUPA-WC-5	Manage DRECP LUPA listed Wilderness Inventory Units to protect wilderness characteristics.	There are no lands with wilderness characteristics in the Palen site.
Compensation		
LUPA-COMP-2	For BLM initiated activities, compensation activities will be initiated or completed within 12 months from the time the resource impact occurs, subject to federal budget appropriations.	The Palen project is not a BLM initiated project.
Transmission CMAs		
LUPA-TRANS-BIO-2	Flight diverters will be installed on all transmission activities spanning or within 1,000 feet of stream and wash channels, canals, ponds, and any other natural or artificial body of water.	The gen-tie line would cross a lot of small desert washes but no streams or larger wash channel or other natural or artificial body of water.
LUPA-TRANS-BIO-3	When siting transmission activities, the alignment should avoid, to the maximum extent practicable, being located across canyons or on ridgelines.	The Palen gen-tie line would not cross canyons or ridgelines.
LUPA-TRANS-CUL-4	For transmission (and renewable energy) activities, demonstrate that results of cultural resources sensitivity, based on the DRECP geodatabase, and other sources, are used as part of the initial planning pre-application process and to select of specific footprints for further consideration.	The geodatabase is not yet completed and the project has already proposed a gen-tie alignment. Surveys have been completed along the transmission alignment.
LUPA-TRANS-WC-1	Allow transmission activities in areas inventoried and identified as lands with wilderness characteristics.	Manage DRECP LUPA listed Wilderness Inventory Units to protect wilderness characteristics.
LUPA-TRANS-WC-2	For inventoried lands found to have wilderness characteristics impacted by transmission activities, compensatory mitigation is required at a 1:1 ratio if wilderness characteristics are directly impacted.	Manage DRECP LUPA listed Wilderness Inventory Units to protect wilderness characteristics.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
Ecological and Cultural Conservation	There are no Ecological and Cultural conservation areas within the Palen site so none of these CMAs would apply	
National Conservation Lands	The Palen site is not located in California Desert National Conservation Lands so none of these CMAs would apply.	
Areas of Critical Environmental Concern	The Palen site is not located in Areas of Critical Environmental Concern so none of these CMAs would apply.	
Wildlife Allocations	The Palen site is not located in a Wildlife Allocation so none of these CMAs would apply.	
Special Recreation Management Areas	The Palen site is not located in a Special Recreation Management Area so none of these CMAs would apply.	
Extensive Recreation Management Areas	The Palen site is not located in an Extensive Recreation Management Area so none of these CMAs would apply.	
Development Focus Areas and Variance Process Lands		
DFA-VPL-BIO-IFS-2: Mojave Ground Squirrel	Within the Mohave ground squirrel range configure solar panel and wind turbine arrays to allow areas of native vegetation that will facilitate Mohave ground squirrel movement through the project site. This may include raised and/or rotating solar panels or open space between rows of panels or turbines. Fences surrounding sites should be permeable for Mohave ground squirrels.	The Palen site is outside Mohave ground squirrel range
DFA-VPL-BIO-BAT-1	Wind projects will not be sited within 0.5 mile of any occupied or presumed occupied maternity roost.	The Palen project is not a wind project.
DFA-VPL-BIO-COMP-2	Exception to the biological resources standard compensation ratio of 1:1 - desert tortoise intact linkage habitat compensation ratio of 2:1 applies to the identified modeled intact linkage habitat (Appendix D) in two linkages—Ord-Rodman critical habitat unit to Joshua Tree National Park, and Fremont-Kramer critical habitat unit to the Ord-Rodman critical habitat unit, as identified in Appendix D. Maintenance and enhancement of the function of these two linkages is essential to the function of the Ord-Rodman critical habitat unit.	The Palen project is not within a desert tortoise linkage.
DFA-VPL-LIVE-1	Avoid siting solar developments in active livestock grazing allotments.	There are no active livestock grazing allotments in the Palen project area.
DFA-VPL-LIVE-2	In California Condor use areas, wind energy ROWs will include a term and condition requiring the permittee and wind operator to eliminate grazing of livestock.	There are no active livestock grazing allotments in the Palen project area.
DFA-VPL-LIVE-3	Include no surface occupancy stipulation on geothermal leases in active grazing allotments.	There are no active livestock grazing allotments in the Palen project area.
DFA-VPL-VEG-1	Vegetative Use Authorizations: Commercial collection of seed in DFAs and VPLs is an allowable use. CMA's within these areas apply to this kind of activity.	The project does not entail commercial collection of seed.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
Development Focus Areas		
DFA-BIO-IFS-4: Mojave Ground Squirrel	The DFA in the "North of Edwards" Mohave ground squirrel key population center is closed to renewable energy applications and any activity that is likely to result in the mortality (killing) of a Mohave ground squirrel until Kern and San Bernardino counties complete county General Plan amendments/updates that include renewable energy development and Mohave ground squirrel conservation on nonfederal land in the West Mojave ecoregion and the CDFW releases a final Mohave Ground Squirrel Conservation Strategy, or for a period of 5 years after the signing of the DRECP LUPA ROD, whichever comes first. If Kern and San Bernardino counties and CDFW do not complete their respective plans within the 5-year period, prior to opening the DFA to renewable energy applications and other impacting activities, BLM will assess new Mohave ground squirrel information, in coordination with the CDFW, to determine if modifications to the DFA or CMAs are warranted based on new Mohave ground squirrel information	The Palen site is outside Mohave ground squirrel range
DFA-BIO-IFS-5	Once the planning criteria in CMA **DFA-BIO-IFS-4**, are met, the DFA in the "North of Edwards" Mohave ground squirrel key population center will be reevaluated. If Kern and San Bernardino counties receive Mohave ground squirrel take authorizations from the CDFW through completed Natural Community Conservation Plans or county-wide conservation strategies that address Mohave ground squirrel conservation at a landscape level and include renewable energy development areas on nonfederal land in the West Mojave ecoregion, the "North of Edwards" key population center DFA will be eliminated and the management changed to General Public Lands, as part of adaptive management	The Palen site is outside Mohave ground squirrel range
DFA-BIO-PLANT -1	Impact to suitable habitat (see Glossary of Terms) for the following plant Focus Species within the DRECP Plan Area will be capped (see "DFA Suitable Habitat Impacts Cap" in the Glossary of Terms) in the DFAs as described below. The suitable habitat impact cap for these plant species is to be measured in DFAs as a group, not individually. Triple-ribbed milk-vetch is an avoidance species in DFAs, therefore none of its suitable habitat is to be impacted ▪ Alkali mariposa-lily: 10% ▪ Barstow woolly sunflower: 20% ▪ Desert cymopterus: 20% ▪ Little San Bernardino Mountains linanthus: 20% ▪ Mojave Monkeyflower: 20% ▪ Mojave tarplant: 20% ▪ Owens Valley checkerbloom: 20% ▪ Parish's daisy: 20%	The Palen site is outside the geographic range of all species listed in the CMA.
DFA-RE-1	In order to use the DRECP's BLM LUPA streamlined process for renewable energy in DFAs and transmission, project proponents must first consult with appropriate representatives of the Department of Defense to ensure the proposed renewable energy and/or transmission activity will not cause an unacceptable risk to national security.	The Palen project is not subject to the DRECP so would not benefit from the streamlining process.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
DFA-REC-1	Retain, to the extent possible, the identified recreation setting characteristics: physical components of remoteness, naturalness and facilities; social components of contact, group size and evidence of use; and operational components of access, visitor services and management controls.	The Palen project site experiences only minor recreational use, it will not result in effects to social components of contact, group size and evidence of use; and operational components of access, visitor services and management controls as there are no visitor services on the site.
DFA-REC-2	Avoid large-scale ground disturbance within one-half mile of Level 3 Recreation facility footprint including route access and staging areas. If avoidance isn't practicable, the facility must be relocated to the same or higher standard and maintain recreation objectives and setting characteristics.	The nearest Level 3 Recreation facility is the Corn Springs Road kiosk which is beyond ½ mile from the Palen project.
DFA-REC-3	SRMAs are exclusion areas for renewable energy development due to the incompatibility with the values of SRMAs.	The Palen site is not located in a SRMA.
DFA-REC-4	When considering large-scale development in DFAs, retain to the extent possible existing, approved recreation activities.	The Palen site has minimal recreational activities that occur in this location. The project would require closure of 14 miles of open roads.
DFA-REC-5	For displacement of dispersed recreation opportunities, commensurate compensation in the form of enhanced recreation operations, recreation facilities or opportunities will be required.	The Palen project would not displace recreation opportunities as the project area is infrequently used for recreation.
DFA-REC-6	Where activities in DFAs displace authorized facilities, similar new recreation facilities/campgrounds will be provided.	The Palen project would not displace authorized facilities as none are located on project site.
DFA-REC-8	Impacts from activities in a DFA to Special Recreation Permit activities will be mitigated by providing necessary planning and NEPA compliance documentation for Special Recreation Permit replacement activities, as determined appropriate on a case-by case basis.	The Palen project would not impact Special Recreation Permit activities.
DFA-REC-9	If residual impacts to SRMAs occur from activity impacts in a DFA, commensurate mitigation through relocation or replacement of facilities or compensation (in the form of a recreation operations and enhancement fund) will be required.	The Palen project would not impact SRMAs – the nearest SRMA is south of the I-10.
DFA-REC-10	Within ERMAs, impacts from development projects that do not enhance conservation or recreation goals will require commensurate mitigation through relocation or replacement of facilities.	The Palen project would not impact ERMAs.
DFA-LANDS-1	Lands within DFAs are available for disposal.	DFA-LANDS-1 is not applicable as it pertains to land disposal and exchange.
DFA-LANDS-2	Development of acquired lands within DFAs is allowed, at the discretion of the BLM California State Director, unless development is incompatible with the purposes of the acquisition and any applicable deed restrictions.	No lands were acquired for the project.
DFA-LANDS-3	Lands proposed for exchange in DFAs will be segregated from the public land laws for 5 years, but wind, solar, geothermal and transmission applications and their associated facilities are allowed.	No land exchanges were made for the project.

Table 2. DRECP CMAs Not Applicable to the Palen Project

DRECP CMA No.	CMA Summary	Rationale
DFA-LANDS-4	Review withdrawn lands in DFAs upon receipt of a ROW application and if appropriate modify to allow for issuance of ROW grants.	No lands were withdrawn for the project.
DFA-LANDS-5	Cost recovery funding used to process a ROW application may be used to adjudicate and remedy any conflicting land withdrawals, if necessary.	No lands were withdrawn for the project.
DFA-LANDS-6	Make public lands in DFAs available for selection by the CSLC in lieu of base lands within DFAs.	The Palen project would not involve any CSLC land exchanges.
DFA-LANDS-7	Transmission facilities are an allowable use and will not require a plan amendment within DFAs.	The Palen project gen-tie line would be located within a DFA but the entire Palen project will include a LUPA as it is not subject to the DRECP.
DFA-WHB-1	Incorporate all guidance provided by the Wild Free-Roaming Horses and Burros Act of 1971, its amendments, associated regulations, and any pertinent court rulings into the project/activity proposal, as appropriate.	There are no wild horses or burros in the project area.
DFA-WHB-2	Development that would reduce burros' access to forage, water, shelter, or space or impede their wild, free-roaming behavior in Herd Management Area is not allowed.	There are no wild horses or burros in the project area.
DFA-WHB-3	Mitigation can only occur on lands that the animals were found at the passage of the Wild Free-Roaming Horses and Burros Act of 1971.	There are no wild horses or burros in the project area.
DFA-WC-1	Renewable energy activities are allowed in DFAs that have been inventoried and identified as lands with wilderness characteristics.	There are no lands with wilderness characteristics in the Palen project area.
DFA-WC-2	For inventoried lands found to have wilderness characteristics in DFAs, compensatory mitigation is required at a 1:1 ratio if wilderness characteristics are directly impacted.	There are no lands with wilderness characteristics in the Palen project area.
Variance Process Lands	The Palen site is not located on Variance Process Lands so none of these CMAs would apply.	
General Public Lands	The Palen site is not located on General Public Lands so none of these CMAs would apply.	